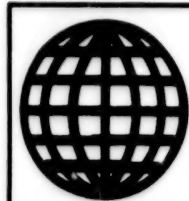


JPRS-JST-94-010

27 June 1994



**FOREIGN
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JPRS Report

Science & Technology

Japan
AIST Research Laboratory Plans

Science & Technology

Japan

AIST Research Laboratory Plans

JPRS-JST-94-010

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1993 AIST Laboratory Research Plans

Forward

94FE0219A Tokyo AGENCY OF INDUSTRIAL
SCIENCE AND TECHNOLOGY in Japanese
31 Oct 93 p 3

[Text] This report outlines the fiscal year 1993 research plans of the Agency of Industrial Science and Technology (AIST) research laboratories and discusses R&D-related support services. It is being published to provide a deeper understanding of the role of AIST laboratories.

This is the 32nd annual laboratory research plan published by the AIST going back to 1962 and is reported to provide the most in-depth look at AIST laboratories.

Looking back at the previous year, we noted that many countries around the world anticipated last year to be a major turning point. An international accord was reached at a UN-sponsored conference on the issue of environmental protection versus economic growth in June in Brussels in which countries agreed to work with one another under the banner of "sustainable development." Turning an eye toward the domestic front, meanwhile, we note that a Five-Year Plan was enacted in June to have the standard of living in Japan match that of the major powers in the world in terms of building an economy in which people experience a real sense of being rewarded for their work. This has been the result of both re-examining the mass-production, consumer-oriented society that Japan has created, and, together with that, recognizing the importance of establishing a foundation of growth built on a harmonious relationship between the environment and society.

Working on that basis, the MITI AIST has produced a comprehensive industrial science policy for 1993 that should contribute to continued growth and popularity of science and technology in Japan.

In 1993, in particular, we note the opening of the new National Institute for Advanced Interdisciplinary Research (NAIR), a new research laboratory that promotes joint research between government, industry, and academia, between different scientific disciplines, and between countries. This year also marks the start of the National Institute of Materials and Chemical Research (NIMC) and the National Institute of Bioscience and Human Technology (NIBH), which were both established to attract researchers in relevant fields of research to conduct research in the area of substances and materials and biotechnology-related fields. In addition, many earlier research projects were reincorporated into the Industrial Science and Technology Frontier Program (ISTF) and New Sunshine Project. Besides the radically new R&D project system, the agency has been formulating various policies to form a three-pillar support structure to promote cooperative international research.

The agency has also been actively working to increase funding of the Japan Key Technology Center that was

founded to promote development of private-sector technologies, and has initiated joint private-sector research projects in regional areas such as the local Large-Scale Project centered around public examination and technology centers that promotes technologies with a local character to them, and on standard basic research aimed at raising the standard of living in Japan to that of other advanced countries.

The R&D being done in science and technology in Japan has to be further consolidated in the future, not merely to sustain economic growth in Japan but also to sustain the growth of the international economy as a whole, and in that context, AIST research laboratories are being counted on to play a major role to make this happen. The great expectations being placed in AIST research laboratories creates complex circumstances for them to operate in, but we believe that it is still possible to energize research activities and produce even more outstanding results.

September 1993

Hiroshi Kashiwagi, Director-General, Agency of Industrial Science and Technology

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FY93 AIST Laboratory Research Budgets

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[Text]

FY93 AIST Laboratory Research Budgets (unit: ¥ 1000)						
Laboratory	Personnel (FY93 year end)			Special Research Budgeted to AIST		
	Researchers	Others	Total	Travel Exp.	Research Exp.	Total
NAIR	37	11	48	2,706	195,234	197,940
NRLM	121	81	202	865	169,679	170,544
MEL	207	47	254	1,164	182,815	183,979
NIMC	352	68	420	2,678	327,517	330,195
GIRI, Osa	159	48	207	1,532	119,168	120,700
GIRI, Nag	176	52	228	1,588	119,182	120,770
NIBH	186	35	221	1,286	150,513	151,799
GSJ	234	99	333	13,955	240,427	254,382
ETL	531	104	635	1,757	674,505	676,262
NIRE	236	57	293	1,782	153,985	155,767
GIDL, Hok	73	25	98	1,119	52,604	53,723
GIRI, Kyu	71	20	91	1,100	60,649	61,749
GIRI, Shi	37	10	47	443	27,670	28,113
GIRI, Toh	39	14	53	534	25,819	26,353
GIRI, Chu	40	11	51	360	33,842	34,202
Tsukuba		138	138			
Planned				8,450	185,398	193,848
Subtotal	2,499	820	3,319	41,319	2,719,007	2,760,326

FY93 AIST Laboratory Research Budgets (unit: ¥ 1000) (Continued)

Laboratory	Personnel (FY93 year end)			Special Research Budgeted to AIST		
	Researchers	Others	Total	Travel Exp.	Research Exp.	Total
Other Labs						
Total	2,499	820	3,319	41,319	2,719,007	2,760,326
AIST HQ	1	247	248			
Total	2,500	1,067	3,567	41,319	2,719,007	2,760,326

Note: Includes assigned researchers; one patent specialist included with NIBH (and other) personnel

Key: NAIR: Natl. Institute for Advanced Interdisciplinary Research; NRLM: National Research Laboratory of Metrology; MEL: Mechanical Engineering Laboratory; NIMC: National Institute of Materials and Chemical Research; GIRI, Osaka: Government Industrial Research Institute, Osaka; GIRI, Nagoya: Government Industrial Research Institute, Nagoya; NIBH: National Institute of Bioscience and Human Technology; GSJ: Geological Survey of Japan; ETL: Electrotechnical Laboratory; NIRE: National Institute for Resources and Environment; GIDL, Hokkaido: Government Industrial Development Laboratory, Hokkaido; GIRI, Kyushu: Government Industrial Research Laboratory, Kyushu; GIRI, Shikoku: Government Industrial Research Laboratory, Shikoku; GIRI, Tohoku: Government Industrial Research Laboratory, Tohoku; GIRI, Chugoku: Government Industrial Research Laboratory, Chugoku; Tsukuba: Tsukuba Research Center Support Services

AIST Lab					Specific Int'l. Joint Research Programs	Total
	Research Equipment	Geological Surveys	Administration, Dissemination, Promotion of Research Results	Subtotal		
NAIR	4,104			202,044		202,044
NRLM	4,450		1,126	176,120	10,847	186,967
MEL	4,450		14,304	202,733	8,346	211,079
NIMC	4,450		24,384	359,029	16,694	375,723
GIRI, Osa	67,066		9,483	197,249	8,847	206,096
GIRI, Nag	48,946		7,379	177,095	8,648	185,743
NIBH	4,450		14,792	171,041	16,995	188,036
GSJ	4,450		340	259,172	8,647	267,819
ETL	4,450	134,148	18,436	833,296	8,941	842,237
NIRE	29,170		6,820	191,757	19,143	210,900
GIDL, Hok	27,440		1,653	82,816		82,816
GIRI, Kyu	45,996		5,234	112,979		112,979
GIRI, Shi	41,200		3,221	72,534		72,534
GIRI, Toh			1,622	27,975		27,975
GIRI, Chu			1,551	35,753		35,753
Tsukuba	7,916			7,916		7,916
Planned			12,834	206,682	23,113	229,795
Subtotal	298,538	134,148	123,179	3,316,191	130,221	3,446,412
Other Labs						
Total	298,538	134,148	123,179	3,316,191	130,221	3,446,412
AIST HQ	4,450	364,050 ^{*2}	50,389	418,889	285,587	704,476
Total	302,988 ^{*1}	498,198	173,568	3,735,080	415,808	4,150,888

*1: Includes cost of renting computers; *2: Table 1 below

Table 1

Itemized Expenses	(Unit: ¥ 1000)
Research Exchanges and Mergers	29,475
Interdisciplinary Research and Exchange	45,414
General Meetings To Promote Research	1,684
Research Commissioning	28,442
Public-Private Sector Joint Research	250,015
Twin Research Lab System	9,020
Total	364,050

FY93 AIST Laboratory Research Budgets (Unit: ¥ 1000) (aggregate)

AIST Lab	Int'l. Science and Technology R&D	Energy-Environment Technology R&D	Key Regional Technology R&D	Biofunction Applications Technology R&D	Total
NAIR	48,777				48,777
NRLM	44,810	29,465			74,275
MEL	115,471	61,596	2,717	8,655	188,439
NIMC	253,205	138,111			391,316
GIRI, Osa	76,495	112,348	64,837	5,517	259,157
GIRI, Nag	45,985	51,752	43,012	6,245	146,994
NIBH	234,500	80,004		146,730	461,234
GSJ	18,183	30,136			48,319
ETL	206,211	87,972		168,380	462,563
NIRE	87,544	140,086			227,630
GIDL, Hok	31,287	100,814	36,850		168,951
GIRI, Kyu	1,285	10,350	20,697		32,332
GIRI, Shi	8,800	9,000	15,087		32,887
GIRI, Toh	4,500	9,347	34,863		48,710
GIRI, Chu	5,140	12,440	31,692		49,272
Tsukuba					
Planned	13,769 ^{*3}	15,461 ^{*3}	35,028 ^{*3}	6,570 ^{*3}	70,828
Subtotal	1,195,962	888,882	284,783	342,097	2,711,724
Other Labs	201,086	50,163			251,249
Total	1,397,048	939,045	284,783	342,097	2,962,973
AIST HQ	60,284 ^{*4}	93,713	5,360	5,594	164,951
Total	1,457,332	1,032,758	290,143	347,691	3,127,924

*3: Includes visiting researchers (cf. Table 2 below); *4: Includes adjustment cost (¥ 4.98 million)

Table 2

Itemized Expenses	(Unit: ¥ 1000)
Special Research	20,611
Designated Research	25,805
(Industrial Science and Tech. R&D)	10,011
(Energy-Environment Technology R&D)	6,411
(Key Regional Technology R&D)	5,360
(Biofunction Applications Tech. R&D)	4,023
Total	46,416

FY93 AIST Laboratory Research Budgets (Unit: ¥ 1000)

AIST Lab	Lab Operating Costs						Total
	Wages-Salaries	Staff Travel	Agency Expenses	Researcher Expense	Special Test Equipment Maintenance	Other Expenses	
NAIR	380,684	1,492	3,230	51,383		38	436,827
NRLM	1,624,123	5,796	11,558	175,992	295	85,381	1,903,145
MEL	2,101,524	7,560	9,394	302,937		171	2,421,586
NIMC	3,795,884	12,589	15,438	510,003		114	4,334,028
GIRI, Osa	1,717,506	7,033	26,377	231,588	24,263	38	2,006,805
GIRI, Nag	1,889,723	7,438	24,847	256,776	28,259	38	2,207,081
NIBH	1,983,407	6,493	9,964	270,537		104	2,270,505
GSJ	2,600,356	40,771	27,688	339,002	6,516	573	3,014,906
ETL	5,224,139	19,904	24,995	769,664		10,528	6,049,230
NIRE	2,465,830	9,640	20,326	343,329		220	2,839,345
GIDL, Hok	863,739	4,606	42,834	107,528	13,736	38	1,032,481
GIRI, Kyu	720,449	4,481	21,315	102,422	6,611	39,870	895,148
GIRI, Shi	381,814	2,534	13,324	53,375	9,303	54,922	515,272
GIRI, Toh	408,379	2,110	17,526	56,259	9,440	57	493,771
GIRI, Chu	419,632	2,777	42,382	59,145	11,384	9	535,329
Tsukuba	*5	*5	*5				
Planned							
Subtotal	26,577,189	135,224	311,198	3,629,940	109,807	192,101	30,955,459
Other Labs							
Total	26,577,189	135,224	311,198	3,629,940	109,807	192,101	30,955,459
AIST HQ							
Total	26,577,189	135,224	311,198	3,629,940	109,807	192,101 ^{*6}	30,955,459

*5: Wages/salaries, travel, and agency expenses of Tsukuba research support lab included in general admin of *8; *6: cf. Table 3 below

Table 3

Itemized Expenses	(Unit: ¥ 1000)
Instrument Inspections	87,189
Land and Building Leasing	40,407
Vehicle Duties	1,281
Liability Reimbursements	200
Lab Equipment Upkeep and Maintenance	43,976
Relocation	19,048
Total	192,101

FY93 AIST Laboratory Research Budgets (Unit: ¥ 1000)

AIST Lab	Lab Operating Costs	Joint Operating Costs for Tsukuba Research Labs	Other Expenses	Total
NAIR	646,143	56,803		1,390,594
NRLM	15,000	98,628		2,278,015
MEL		176,208		2,997,312
NIMC	197,635	248,555		5,547,257
GIRI, Osa	42,581			2,514,679

FY93 AIST Laboratory Research Budgets (Unit: ¥ 1000) (Continued)

AIST Lab	Lab Operating Costs	Joint Operating Costs for Tsukuba Research Labs	Other Expenses	Total
GIRI, Nag	29,870			2,569,688
NIBH		137,174		3,056,949
GSI	38,904	226,836		3,596,784
ETL		358,796		7,712,826
NIRE	15,000	179,968		3,472,843
GIDL, Hok	72,700			1,356,948
GIRI, Kyu	24,637			1,065,096
GIRI, Shi				620,693
GIRI, Toh	91,378			661,834
GIRI, Chu	25,283			645,637
Tsukuba	722,208	5,143,371		5,873,495
Planned		288,971	138,181	727,775
Subtotal	1,921,339	6,915,310	138,181	46,088,425
Other Labs				251,249
Total	1,921,339	6,915,310	138,181 ^{*7}	46,339,674
AIST HQ	215,098		11,059,456 ^{*8}	12,143,981
Total	2,136,437	6,915,310	11,197,637	58,483,655

*7: See Table 4 below; *8: See Table 5 below

Table 4

Itemized Expenses	(Unit: ¥ 1000)
Industrial Science and Tech. Liaison Committee	628
Int'l. Cooperation Regarding Weights and Measures	2,755
General Administration (lab repairs and general management costs)	92,947
Visiting Researcher Expenses	20,611
Research on Maintaining Industrial Infrastructure	21,240
Total	138,181

Table 5

Itemized Expenses	(Unit: ¥ 1000)
General Administration (excludes costs pertaining to liaison committees, int'l. cooperation on weights/measures, and lab repairs)	3,160,215
Internal-External Research Management System and Prediction System	5,493
Expenses Pertaining to Industry Standardization	581,776
Investments and Subsidies in Organizations Developing New Energy Resources and Technologies	5,114,793
Subsidies for Joint International R&D	624,642
Promoting Int'l. Cooperation in Basic Biofunction Research	1,553,300
Feasibility Studies on Joint Int'l. Research	14,357
Funding of Organizations Promoting Economic Cooperation	4,880
Total	11,059,456

FY93 AIST Laboratory Research Budgets (Unit: ¥ 1000)

AIST Lab	Research Oriented Toward Small- Medium Companies	Research on Peaceful Atomic Energy Uses	Pollution Prevention Technologies	Int'l. Ind. Tech. Research	Total	Misc. Costs Other Bureaus	General Accounts Total
NAIR							1,390,594
NRLM	7,360	34,717		12,461	54,538		2,332,553
MEL	6,575	15,046	100,482	27,681	149,784		3,147,096
NIMC		38,099	132,598	20,793	191,490		5,738,747
GIRI, Osa		12,887	50,658	7,745	71,290		2,585,969
GIRI, Nag	12,694	27,021		6,324	46,039		2,615,727
NIBH	5,945		72,797	2,907	81,649		3,138,598
GSJ		47,225	24,639	18,114	89,978		3,686,762
ETL		656,996	46,279	13,182	716,457		8,429,283
NIRE		18,057	378,229	20,193	416,479		3,889,322
GIDL, Hok			60,464	11,264	71,728		1,428,676
GIRI, Kyu		8,875			8,875		1,073,971
GIRI, Shi	11,506	15,656	17,235	4,025	48,422		669,115
GIRI, Toh		13,197		708	13,905		675,739
GIRI, Chu	6,743		143,925	3,383	154,051		799,688
Tsukuba							5,873,495
Planned	2,134				2,134		729,909
Subtotal	52,957	887,776	1,027,306	148,780	2,116,819		48,205,244
Other Labs							251,249
Total	52,957	887,776	1,027,306	148,780	2,116,819		48,456,493
AIST HQ				166,749	166,749	1,242,660 ^{*10}	13,553,390
Total	52,957 ^{*9}	887,776	1,027,306	315,529 ^{*9}	2,283,568	1,242,660	62,009,883

*9: Includes long- and short-term training costs of technical advisors (¥ 2.134 million); *10: See Table 6 below

Table 6

Itemized Expenses	(Unit: ¥ 1000)
Small- to Medium-Corp Related Programs (applications on ways to measure human senses)	900,000
International-Related Programs	327,798
Operation of Industrial Technology Counsels	14,359
Industrial Sci./Tech. Liaison Committees (MITI)	503
Total	1,242,660

FY93 AIST Laboratory Research Budgets (Unit: ¥ 1000)

AIST Lab	Special Accounts					AIST Total
	Industrial Sci./Tech. R&D	Energy-Environment Tech. R&D	Biofunction Applications R&D	Other Expenses	Special Accounts Total	
NAIR	76,082				76,082	1,466,676
NRLM	103,990	18,558			122,548	2,455,101
MEL	147,921	282,316			430,237	3,577,333
NIMC	146,328	51,658			197,986	5,936,733
GIRI, Osa	100,526	198,279			298,805	2,884,774
GIRI, Nag	55,436	33,742			89,178	2,704,905
NIBH	140,592			105,865	246,457	3,385,055

FY93 AIST Laboratory Research Budgets (Unit: ¥ 1000)

AIST Lab	Special Accounts					AIST Total
	Industrial Sci Tech. R&D	Energy-Environment Tech. R&D	Biofunction Applications R&D	Other Expenses	Special Accounts Total	
GSJ		472,433			472,433	4,159,195
ETL	599,046	748,873	30,000		1,377,919	9,807,202
NIRE		188,614		15,992	204,606	4,093,928
GIDL, Hok					0	1,428,676
GIRI, Kyu	17,134				17,134	1,091,105
GIRI, Shi	6,276	3,000			9,276	678,391
GIRI, Toh		44,067			44,067	719,806
GIRI, Chu		3,000			3,000	802,688
Tsukuba						5,873,495
Planned						729,909
Subtotal	1,393,331	2,044,540	30,000	121,857	3,589,728	51,794,972
Other Labs					0	251,249
Total	1,393,331	2,044,540	30,000	121,857	3,589,728	52,046,221
AIST HQ	18,336,896	3,960,191		5,132,769	61,429,856	74,983,246
Total	19,730,227	40,004,731	30,000	5,254,626	65,019,584 ^{*11}	127,029,467

*11: See Table 7 below

Table 7

Itemized Expenses	Special Account	(Unit: ¥ 1000)
Tokkyo Biseibutsu Kitaku Center (NIBH)	Patents	105,865
Mining Safety Research (NIRE)	Coal	15,992
Industrial Science and Technology R&D		19,730,227
	Petroleum	8,918,891
	Elec. Power Development	10,811,336
Energy-Environment Technologies R&D		40,004,731
	Petroleum	16,400,663
	Elec. Power Development	23,604,068
Alternative Energy Related Commercial Development Grants		3,497,198
	Petroleum	2,864,146
	Elec. Power Development	633,052
Enactment of Industrial Standardization Law	Elec. Power Development	220,000
Dissemination and Promotion of Research Findings		18,477
	Petroleum	8,757
	Elec. Power Development	9,720
International Cooperative Research Programs	Petroleum	1,026,206
New Methods of Making Composite Materials		370,888
	Petroleum	295,736
	Elec. Power Development	75,152
Biofunction Application Technologies R&D	Elec. Power Development	30,000
Total		65,019,584

Note: The items listed in the above table have been budgeted to either the patent special account, the coal and petroleum special account, or the electric power development special account. That is what accounts for the fact that the total AIST related budget is ¥ 1,270 trillion. The AIST laboratory related portion accounts for 41 percent, or ¥ 518 trillion, of that budget.

Research Plans by Laboratory, Subject

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[Text]

1. Research Plans by Laboratory

(1) National Institute for Advanced Interdisciplinary Research (NAIR)				
Area of Research	Research Item	Term	Chief Researcher (and others)	Amount Budgeted (¥ 1000)
(Special Research)	Research on cluster science	1992-97	Takeo (6)	98,988
	Research on bionic design	1992-97	Tateishi (6)	98,952
(Industrial Technology)	Development of element technologies for molding advanced materials used in power generating environments	1993-01	Tanaka (17)	75,855
	R&D on basic technologies involved in atomic/ molecular observation and manipulation	1994-01	Tanaka (17)	48,777
Nuclear Technologies	Basic research on self-organization of atomic groups	1992-97	Tanaka (17)	28,546
Cluster Science	Basic research on process by which clusters are formed	1992-97	Takeo (6)	13,322
Bionic Design	Basic research on development of biomimetic material elements	1992-97	Tateishi (6)	9,515
Nuclear Technologies	Basic research on method of evaluating static and dynamic structures at the atomic level	1993	Tanaka (17)	Undecided
Cluster Science	Research on cluster forming process	1993	Takeo (6)	Undecided
Bionic Design	Basic research on rebuilding living tissue	1993	Tateishi (6)	Undecided

(2) National Research Laboratory of Metrology (NRLM)				
Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research to evaluate ITS-90 consistency at room temperature	1991-94	Sakurai (2)	15,543
	Research on atomic beam type cesium frequency standard	1991-94	Nakadono (3)	18,074
	Research on ultra-clean spatial measurements	1991-93	Tanimura (7)	15,061
	Research on high-precision molecular spectral probing method for frequency/wavelength standard	1992-96	Sakuma (5)	17,063
	Research on basic phase-conjugated photometry	1992-95	Matsumoto (1)	14,050
	R&D to develop automation and control technology for calibrating weighing equipment	1992-95	Arai (6)	14,183
	Research on super high-resolution spectral diffraction based on neutron-ion cooling	1993-97	Ito (5)	18,074
	Research to perfect material weight standards	1993-96	Sakurai (6)	21,609
	Research on high-precision measurement of trace moisture in gas	1993-96	Takahashi (3)	12,061
	Research on flow standards based on ultra high-precision sonic nozzle	1993-95	Takamoto (3)	13,060
	Research on micromachines (evaluate mechanical characteristics of silicon micromachine elements)	1990-94	Tanimura (3)	11,766
	R&D on advanced next-generation production system technologies	1991-93	Tanimura (3)	1,180
	Research on temperature measurement in super hot temperature region	1993-95	Sakuma (1)	10,847

(2) National Research Laboratory of Metrology (NRLM) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research) (continued)	Research on construction of high quality design system	1992-94	Koike (3)	7,360
	Development of high-performance X-ray spectral interferometer for atomic energy development uses	1989-94	Nakayama (2)	17,276
	Research on technology for evaluating heat property data for nuclear materials	1993-97	Nagai (3)	17,441
	Research on standard substances and means of measuring heat properties of solid materials	1991-93	Nagai (3)	4,013
	Research on technology for calibrating radiation thermometers in the mid- to high-temperature range	1993-95	Tanaka (4)	7,469
(Industrial Technology)	Development of element technologies for upgrading processing equipment used in power plants (absolute evaluation of physical properties)	1988-93	Sakurai (5)	21,400
	R&D to evaluate ultra-small biosensors (evaluation based on AFM of functional protein aggregate microstructure)	1989-98	Sakuma (3)	8,808
	R&D on non-linear photoelectric materials (methods for evaluating non-linear optical constants)	1989-98	Sakuma (4)	37,946
	Evaluate development of carbon composites used in high-efficiency power plants (evaluation of thermal properties)	1989-96	Nagai (4)	8,500
	Method of evaluating improvements in operating environments of commercial nuclear power plants (research on non-contact measurement of body surface temperature based on thermal radiation)	1990-98	Nagai (3)	8,398
	Assessing high-current/high-field superconducting materials (assess thermal and optical properties)	1990-97	Nagai (5)	21,000
	R&D on advanced processing methods (research on ways of measuring surface reactions)	1990-96	Sakuma (3)	6,864
	R&D on micromachine technology (evaluation of micromachine elements)	1991-00	Tanimura (4)	26,500
	R&D on super high-temperature gas turbines used in electric power plants (assess flow areas using laser applications)	1993-96	Tanimura (2)	9,000
(New Sunshine Project)	Research on superconducting materials (research on measuring thermodynamic characteristics)	1988-95	Sakurai (5)	2,000
	R&D on global environment technologies (research on ways of measuring CO ₂)	1989-95	Sakurai (7)	16,000
	Leading and basic energy conservation technologies (development of non-contact temperature measurement and research to upgrade heat management)	1990-94	Sakurai (3)	9,229
	Wide-area energy utilization network (research on measuring fluid pollutants)	1993-01	Sakurai (3)	2,040
	Wide-area energy utilization network (assessing ways to measure fluid pollutants)	1993-01	Sakurai (3)	8,000
	Superconductivity applications (assess composite characteristics)	1993-95	Sakurai (5)	10,500
Quantum Research	Research on improving international unit system	1991-93	Miyake	320
	Research on sub-natural spectral separation based on double photoresonance	1991-93	Hirano	1,560
	Research to develop commercial wavelength and frequency standards in near infrared range	1991-93	Sakuma (4)	1,880
	Research on iodine-stabilized laser stabilization	1991-93	Kurozawa (3)	1,750

(2) National Research Laboratory of Metrology (NRLM) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
	Research on control/measurement of optical signals	1991-93	Matsumoto (3)	1,550
	Research to establish standards for large dimensions	1991-93	Matsumoto (3)	1,000
	Research on absolute measurement of gravity constant G	1991-93	Nakayama (1)	1,300
	Research on basic hard X-ray diffraction, interference, and spectral diffraction	1991-93	Nakayama (2)	1,000
	Research on scanning-type probe microscope	1992-94	Nakayama (1)	1,100
	Research on measuring temperature of trapped ions	1992-94	Ida (1)	1,050
	Research on manipulation of microscopic specimens using a laser	1993-95	Sakaguchi (1)	1,150
	Research on automating international comparison of time standards	1991-93	Nakadono (3)	1,850
	Research on upgrade of standard wavelength laser	1993-95	Ito (2)	1,800
	High-resolution spectral separation of gaseous atoms and molecules by CARS and optical effect	1993-95	Akamatsu (1)	1,400
	Research on absolute measurement of magnetic quantum by flotation in superconducting electromagnetic field	1993-94	Sakuma (2)	1,650
Thermal Properties	Research on low-temp thermometer calibration	1991-93	Sakurai (1)	1,700
	Research on fixed-point correction for aluminum impurities	1991-93	Takiya (1)	1,000
	R&D on measuring high-pressure viscosity and super high-pressure viscosity	1991-93	Kobayashi (1)	1,670
	Research to evaluate fluidity of fluids in dispersed system	1992-94	Najima	1,220
	Research to evaluate characteristics of weak superconducting metal junctions	1992-94	Kawade (2)	1,560
	Research on ways to calculate temperature distribution in an object's surface	1992-93	Owada	600
	Research on parametric oscillating pulse laser	1993-95	Mito (2)	1,200
	Research on measuring steam pressure at extremely low temperatures	1993-95	Tamura (1)	2,070
	Research on fixed-point temperatures of organic systems near room temperature	1993-95	Shirayanagi (2)	1,980
	Research on melting and hardening temperature of materials with high melting points	1993-95	Sakade (1)	1,300
	Research on measuring thermal properties of fluids	1993-95	Masui (2)	1,850
	Research on density standards	1993-95	Masui (2)	1,670
	Research on temperature transfer standards	1993-95	Takahashi (2)	3,560
	Research on optical sensors for earth observations	1991-95	Sakuma (1)	1,120
Mechanics	Research to evaluate cleaning method for prototype kilogram	1991-93	Ikeda (3)	2,530
	Research on stability of standard power transfer devices	1991-93	Tojo (1)	1,270
	Research on 3-D method for evaluating surface shapes	1991-93	Sakano (2)	2,300
	Research on vibration technology for performing precision measurements	1991-93	Shiraishi (1)	1,300
	Research on rectifying effects by turbulence control	1991-93	Nakao (1)	2,260
	Research on upgrading pressure measurements	1991-93	Yamamoto (2)	1,700

(2) National Research Laboratory of Metrology (NRLM) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Mechanics (continued)	Research to evaluate dynamic characteristics of sensors by shock	1993-95	Ueda (1)	1,480
	Research to evaluate accuracy of movement by tracking-type interferometer	1993-95	Goto (1)	1,420
	Research on upgrading optical surface detection	1993-95	Doi (2)	2,340
	Research on upgrading flow rate measurement technology	1993-95	Takamoto (3)	1,440
	Improving accuracy of Charpy impact test	1992-94	Yamaguchi (3)	990
	Ways of measuring the mechanical characteristics in microflow regions	1993-95	Nakao (4)	3,250
Measurement Systems	Research on reducing 3-D measurement error	1991-93	Kamoshita (2)	1,260
	Research to evaluate surface strength characteristics of mechanical components	1991-93	Ishida (3)	1,600
	Research on ways of evaluating electromagnetic resistance in electronic weighing equipment	1991-93	Akimoto (1)	1,000
	Research on ways of evaluating physical data	1992-94	Arai (1)	400
	Research on functional control of dynamic measurement lasers	1992-94	Akimoto (1)	3,780
	Dynamic calibration of weighing equipment	1992-93	Akimoto (2)	2,340
	Multidimensional light standard measurements	1993-95	Takatsuji (1)	3,030
	Research to evaluate mechanical strength characteristics of flexible laminates	1992-94	Miyashiro (2)	2,240
	Research to evaluate transfer properties of fine ceramics	1992-94	Koike (2)	2,120
Osaka Metrology Systems Center	Development of high-temperature blackbody furnace	1991-93	Fujiwara	1,600
	Research on environmental sensing technology based on light waves	1991-93	Kiyomizu (3)	2,900
	Research on improving calibration, testing, and inspection systems using computers	1993-94	Hatanaka	1,200
	Research to upgrade measurement of thermal conductivity in liquids and assess data obtained therein	1993-94	Watanabe (1)	950
Quantum Research	Research on ways to measure the density properties of microliquids	1993	Tanaka (4)	Undecided
Mechanics Dept.	Research on high-precision method for measuring multiple component forces	1993	Uchikawa (2)	Undecided
Osaka Metrology Systems Center, etc.	Research on stabilizing and controlling wavelength oscillations in semiconductor lasers	1993	Watanabe (5)	Undecided

(3) Mechanical Engineering Laboratory (MEL)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on innovative optical element technology for data processing	1989-93	Matsuda (5)	8,382
	Research on fabrication of wide range of ultra-high-precision surface shapes	1993-97	Inoue (5)	8,250
	Biomechanical research on bone formation and alternatives	1992-94	Tateishi (7)	13,672
	R&D on vibration-resistant alloys	1989-93	Nakazawa (4)	8,005
	Research on manufacturing process for superlattice materials	1992-96	Nakazawa (8)	13,306
	Research on "intelligent" control processing technology	1989-93	Inoue (5)	10,565
	Research on dynamic skills	1991-95	Nozaki (6)	15,560
	Research on construction of dynamic world model for self-locomotive robots	1992-95	Matsuda (5)	13,844
	Research on "whole-arm manipulation"	1992-96	Nozaki (6)	14,235
	Research on positioning and attitude technology for use in space	1993-97	Matsuda (8)	9,362
	Research on remote programming based on virtual environments	1993-97	Nozaki (8)	7,345
	Research on hydrodynamic characteristics of turbopumps for artificial hearts	1993-97	Konya (3)	9,257
	Research on stationary staging system floating in electromagnetic field	1991-95	Takie (3)	14,630
	Research on technology for manufacturing thin boards made using advanced metallic materials	1991-95	Nakazawa (2)	9,619
	Research into virtual air-conditioning system	1991-95	Inoue (9)	17,122
	Research on high-efficiency propulsion technology for passenger ships	1992-94	Matsuda (2)	10,825
	Research on advanced next-generation production systems	1991-93	Inoue (22)	15,027
	Research on holographic interferometer for precise measurement of shapes	1991-94	Matsuda (4)	11,280
	Research on advanced welding system for dissimilar materials	1991-94	Inoue (4)	6,575
	Non-contact remote monitoring technology for structural elements of nuclear power plants	1993-97	Inoue (7)	15,046
	Research on commercializing diesel exhaust particle removal system with filter trap and catalytic converter	1990-93	Konya (3)	13,466
	Basic research on air purification methods for closed spaces such as tunnels	1991-95	Konya (2)	19,948
	Research on ways to reduce tire noise	1992-94	Takie (5)	32,038
	Research on purifying diesel engine exhaust gas by mid- to late-stage combustion	1992-95	Konya (2)	18,864
	Research on reducing diesel engine pollution by low-cetane combustion	1993-96	Konya (2)	16,166
	Research on high-performance metallic composites	1993-97	Sano (7)	25,996
	Research on surface processing and reforming technology	1992-95	Nakazawa (10)	1,685
(Industrial Technology)	Development of deep underground spaces Construction of deep underground spaces (automated/unmanned exploration)	1989-95	Nozaki (3)	6,975
	Ecofactory technologies	1993-94	Inoue (25)	27,981

(3) Mechanical Engineering Laboratory (MEL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Industrial Technology) (continued)	R&D on super enviro-resistant materials Development of intermetallic compounds (development of advanced intermetallic compounds by agitation synthesis and composition control)	1989-96	Nakazawa (3)	22,520
	New software models R&D on analysis/modeling of coordination system (research on agents that make up machine design)	1991-97	Matsuda (6)	7,798
	Medical and welfare equipment technologies Basic research on human interface technology for helping the elderly and physically handicapped with outdoor activities (wheelchair design and movement support system)	1993-96	Nozaki (3)	14,657
	Next-generation engineering systems for speaking devices	1993-96	Tateishi (5)	10,772
	Optical imaging system	1992-98	Tateishi (5)	9,214
	Load-control walking aids	1992-95	Nozaki (4)	15,554
	Element technologies involved in manufacture of parts/materials used in electric power plants Assess methods of manufacturing parts/materials used in electric power plants (assess mechanical characteristics)	1988-93	Takie (16)	36,900
	Assess degree of sophistication of operating environments of commercial nuclear power plants Research on interrelation between external stimuli and physiological and sensory factors (research into artificial realities in order to assess human sensory characteristics)	1991-98	Nozaki (5)	10,798
	R&D on measurement of physiological effects (research on non-invasive ways to measure substances involved in stress reactions)	1990-98	Nozaki (7)	6,483
	Assess technical development of advanced maintenance procedures in electric power plants Evaluation of micromovement mechanisms	1992-00	Takie (16)	72,304
	Assess technical development of carbon composites used in modern electric power plants Assess technical development in fabrication of carbon composites (assess properties and fracture toughness)	1992-96	Nakazawa (3)	10,000
	R&D on gas turbines used in electric power plants R&D on ultra-high-temperature gas generator (assess mechanical elements of very high- temperature gas generator)	1993-96	Takie (6)	11,000
(New Sunshine Project)	R&D on H ₂ energy technologies Research on H ₂ uses (basic research on H ₂ -O ₂ fuel system)	1991-98	Konya (3)	10,552
	(analyze/assess data from research on hydrogen- fueled turbines)	1993-96	Konya (2)	16,000
	General research Basic R&D on new energy technologies (research on wind power conversion system)	1992-00	Konya (9)	16,171
	Research to support/promote Sunshine Project (assess development of new energy technologies)	1990-97	Konya (3)	3,000
	Costs involved to assess diversity of electric power sources (analyze/assess large wind power generation systems)	1989-00	Konya (9)	95,250

(3) Mechanical Engineering Laboratory (MEL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(New Sunshine Project) (continued)	Costs involved to assess diversity of electric power sources Analyze/assess data associated with development of hydrothermal power plants (analyze/assess detection/transmission mechanisms)	1992-96	Inoue (3)	19,259
	Analyze/assess commercialization of solar-cell power generating systems Analyze/assess development of very high-efficiency solar power cell technology (analyze/assess manufacturing technology for solar cell units)	1993-97	Konya (2)	20,016
	R&D on basic and leading energy technologies Research on small engines that use multiple types of fuel	1990-94	Konya (3)	9,330
	Research on ceramic turbine R&D on element technologies (research on elementary components)	1988-96	Konya (6)	3,171
	Assess performance (assess elementary components)	1989-96	Konya (8)	78,480
	Wide-area energy utilization network Research on extreme heat utilization and heat conversion technology (analyze energy efficiency of heat utilization systems)	1993-00	Konya (5)	3,090
	(research to assess heat storage and heat transfer characteristics)	1993-00	Konya (5)	12,000
	Research on superconducting power applications Technical assessment (assess structural soundness)	1988-95	Nakazawa (4)	41,000
	R&D on global environmental technologies CO ₂ related technologies (research on deep underwater CO ₂ fixing)	1991-95	Nishio (3)	16,001
(Biofunction Research)	R&D on industrial technologies making use of biofunction applications Research on perception, recognition, movement, and behavioral control (research on substances inside the brain related to behavioral control)	1993-95	Tateisi (6)	8,655
Physical Data	Research on use of holographic elements to measure large-diameter plane mirrors	1993-95	Takeya (4)	2,500
	Elucidation of fluid interface phenomenon	1993-95	Ichikawa (3)	5,900
	Control technology for mechanical structures	1992-94	Kurokawa (4)	900
	Research on advanced numerical analysis methods	1993-95	Tezuka (3)	4,000
	Research on random data processing in mechanical measurements	1992-94	Nomura (3)	800
	Research on manufacture of nerve specimens for use in polishing	1993-95	Fukui (3)	1,900
	Elucidating processes by which bone and joint tissue are damaged and repaired	1992-94	Shirazaki (9)	1,300
	Predicting accidents based on behavior of car groups encountering yellow signal lights	1993-95	Matsuda (1)	500
	Lateral and longitudinal control of self-locomotive vehicles	1993-95	Tsugawa (5)	2,300
Basic Machine Technology	Research on transfer characteristics of mechanical elements	1991-93	Kotorii (6)	3,860
	Research on mechanical mechanisms in phase-variable fluids	1993-95	Ozaki (1)	1,470
	Research on damage to rolling surfaces	1991-93	Miyoshi (1)	1,500
	Research on measuring impact sounds	1991-93	Nii (1)	820

(3) Mechanical Engineering Laboratory (MEL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(New Sunshine Project) (continued)	Active noise control of radiating 3-D vibrational noise	1992-94	Tanaka (2)	1,248
	Research on non-steel friction materials	1992-93	Hoshino (2)	800
	Investigative research on safety of man-vehicle systems	1993-94	Shimizu (5)	1,380
	Basic research on worker-friendly machines	1991-93	Koda (8)	2,100
	Control of electrical discharge by laser in underwater work environment	1992-94	Hoshi (3)	4,070
Material Engineering	Research on development of vibration and shock resistant sensors	1992-94	Tanifuji (1)	820
	Research on shape remembering features of highly oriented polymer materials and assess the dynamic characteristics thereof	1992-94	Ishine (2)	4,860
	Research on superplasticity of single-phase stainless steel	1991-93	Kato (1)	1,020
	Research on improving quality of punched products	1992-94	Asuke (1)	620
	Development of fully-enclosed die forging technology and a quieting technology for forge pressure machines	1993-95	Shinozaki (2)	1,140
	Research on upgrading the function of materials formed by ultra-high isotropic pressure	1992-94	Terazaki (2)	1,940
	Research on very advanced tribology system	1993-95	Enomoto (2)	3,720
	Research on microtribology	1991-93	Nakayama (3)	2,480
	Research on technology for identifying functions of inorganic allotropes	1992-96	Shimura (3)	5,920
Production Systems	Basic research on microgrinding mechanism for crustaceous materials	1991-93	Ito (2)	1,300
	Research on high-quality grinding processes for new composites	1992-94	Waida (3)	1,800
	Thermochemical machining of ceramics having no conduction properties	1991-93	Chikamori (1)	630
	Upgrading joining and reforming technology	1992-94	Shikada (6)	3,630
	Research on upgrading high-precision cutting and micromachining methods	1992-94	Sugano (3)	1,720
	Character recession of machine tool joints	1992-94	Mizuhara (2)	1,030
	Research on advanced human interface technology for machine tools	1992-94	Usui (3)	700
	Basic research on ways of expressing manufacturing knowhow	1993-95	Sekiguchi (2)	2,050
Energy	Thermal sound effects and cryogenic applications	1993-95	Shiraishi (2)	2,900
	Basic research on numerical analysis of turbulence	1993-95	Sasamoto (2)	1,300
	Basic research on turbulent flame structures	1991-93	Kawaguchi (1)	2,200
	Research on closed-cycle MHD power generation system	1992-94	Hasegawa (2)	2,400
	Research on characteristics of aqueous solutions having low freezing points	1993-95	Tanaka (1)	2,500
	Research on quick and easy method of measuring particle concentrations in exhaust gas	1992-94	Saito (3)	1,800
Robot Engineering Dept.	Research on model-free robotics	1992-94	Matsumoto (6)	5,940
	Basic research on robot coordination	1992-94	Komoritani (4)	2,100
	Elementary research on autonomous robots	1991-93	Arai (2)	1,840

(3) Mechanical Engineering Laboratory (MEL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Robot Engineering Dept (continued)	Research on concept design system with advice-giving feature	1992-94	Ito	1,100
	Basic research on integration of sensory and movement functions	1992-94	Oyama (4)	2,100
Physical Data	Research on using interferometer to measure wavelength sweep shapes	1993-94	Matsuda (5)	Unknown
	Research on transport mechanism in polymer aggregates	1993-95	Tateishi (4)	Unknown
Basic Machine Technology	Basic research on tribological control of mechanical elements by electroviscous fluids	1993	Yoshioka (2)	Unknown

(4) National Institute of Materials and Chemical Research (NIMC)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on biomimetic devices	1992-96	Hiratani (4)	14,309
	Research on chemical uses and stabilization of explosions/percussions	1990-93	Kawamura (9)	18,200
	Research on technology to elucidate and prevent specific industrial gas explosions	1993-96	Shin (4)	11,200
	Research on preparation and precision measurement of standard chemical reference materials	1990-94	Kubota (5)	11,200
	Research on precision measurement of biomaterials	1991-94	Kubota (3)	12,100
	Research on use of magnetic fields in separating substances and making high-sensitivity measurements	1993-96	Kubota (8)	9,400
	Research on externally controlled polymer growth process	1990-94	Asai (8)	11,525
	Research on flocculent structure of liquid-crystal polymers	1990-94	Tanabe (7)	10,930
	R&D on organic gradient composites	1990-94	Iguchi (9)	11,842
	Research on polymer-metallic cluster composites	1991-95	Asai (5)	11,081
	Research on functional control of polymer materials	1991-95	Iguchi (15)	13,851
	Research on interface control of partially compatible polymer materials	1992-96	Tanabe (6)	9,759
	Research on precision synthesis and elucidation of structure control polymers	1993-97	Tanabe (8)	9,751
	Research on molecular system with sensing capability	1990-94	Hiraya (8)	15,821
	Research on control and uses of organic/inorganic heterointerfaces	1990-93	Tamaoki (5)	11,200
	Basic research on synthesis of functionally advanced material from polynuclear aromatic compounds	1991-94	Shirota (7)	14,000
	Research on synthesis of biodegradable polymers that use carbon monoxide	1991-94	Shirota (3)	9,775
	Research on surface design of functionally sophisticated reaction elements	1992-95	Takehira (10)	31,000
	Research on gate-type photoorganic materials	1993-97	Asai (6)	9,751
	Research concerned with the invention and application of molecule recognition function	1993-96	Takehira (15)	28,000
	Research on elementary properties and gas synthesis of semi-metallic compounds	1993-96	Imai (3)	11,200

(4) National Institute of Materials and Chemical Research (NIMC) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research (continued))	Research on inventing functional materials and reaction structures for specific reactions	1991-95	Kanzawa (10)	23,300
	Research on synthesis of functional materials to be used in areas of ultra-high-pressure reactions	1993-96	Kawamura (8)	21,000
	Research on structural control and methods of evaluating amorphous polymer materials	1991-93	Kamitani (9)	17,696
	Research on generation and utilization of high-energy density plasma	1990-93	Kawamura (5)	7,767
	Research on revealing catalytic functions by aberrant valency control	1991-94	Takehira (3)	7,767
	Research on fabrication of advanced materials for collecting gaseous radioactive compounds	1989-93	Fukuda (5)	9,834
	Research on elucidating and investigating the degradation of polymer materials in a nuclear environment	1989-93	Kubota (7)	10,258
	Research on methods of excreting in vivo contaminants caused by radioactive nuclide	1990-94	Kubota (2)	18,007
	Research on technologies for predicting environment-related standards for purposes of assessing environmental impact of chemical substances	1990-93	Shin (3)	12,956
	Research on advanced methods of treating effluent containing toxic substances from high-tech industries	1990-93	Kubota (3)	20,313
	Research on upgrading treatment of organic wastewater	1991-95	Kanzawa (4)	15,434
	R&D on microorganic treatment of rubber and plastic waste	1991-95	Shirota (2)	7,270
	Research on complex catalytic system for reducing diesel NO _x	1991-95	Hiratani (3)	14,744
	Research on treatment of toxic chemical gases	1991-94	Kanzawa (2)	11,144
	Research on organic tin alternative antibiotic-bonded polymer	1991-94	Asai (6)	16,073
	Research on sophisticated gas sensors for monitoring the environment	1992-96	Hayashi (4)	18,736
	Research on technologies for dealing with land-based pollution caused by toxic organic compounds	1992-95	Iguchi (6)	15,928
	Research on greening methods based on functional soil restoration agents	1990-93	Kanzawa (1)	1,228
	Research on lignocellulose polyurethane	1991-94	Hatakeyama (3)	4,343
	Research to develop advanced type of paper	1991-93	Kumai (3)	1,878
	Research on raw materials for chemical industry from natural oils	1992-94	Takehira (3)	1,599
	Research on development of advanced polymer composites	1992-94	Iguchi (4)	3,982
	Research on weather resistance of polymer materials in low latitude areas	1993-96	Asai (2)	4,940
	Research on treatment of wastes from leather industry	1993-95	Kanzawa (2)	4,199
(Industrial Technology)	R&D on bioelements (formation of input/output transfer mechanism by molecular arrangement)	1986-95	Tamaoki (3)	17,575
	High-current/high-field superconducting materials (synthesis of organic superconducting materials)	1988-97	Tamaoki (4)	12,320
	(crystalline structures)	1988-97	Tamaoki (4)	24,260
	(research on chalcogenite superconducting materials)	1988-97	Tamaoki (4)	9,251

(4) National Institute of Materials and Chemical Research (NIMC) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Industrial Technology (continued))	Manufacturing methods for sophisticated chemical products (lipid manufacturing technologies)	1988-96	Kanzawa (3)	9,819
	Assess element technologies for advanced equipment used to manufacture parts/materials in electric power plants (surface fineness and defect characteristics of parts/materials)	1988-93	Fukuda (8)	20,560
	Assess R&D on non-linear photoelectronic materials (organic materials - heterocyclic compounds)	1989-98	Shin (4)	10,000
	(organic materials - polymer crystal materials)	1989-98	Asai (5)	31,900
	Assess R&D on ultra-small biosensors (evaluate basic characteristics of functional proteins and lipid aggregates)	1989-98	Tanabe (5)	11,939
	R&D on super environment-resistant materials (development of fiber-reinforced Ti-Al intermetallic compound by gas-phase method)	1989-96	Hayashi (2)	17,624
	Assess fabrication technologies for carbon composites used in high-efficiency power plants (assess material life from environmental durability)	1989-96	Hayashi (6)	12,000
	R&D on human sensory related technologies (research on clothing functionality)	1990-98	Shibutani (5)	12,603
	(research on comfortable physical environments)	1990-98	Yamada (5)	9,600
	R&D on innovative manufacturing technologies (R&D on microscopic crystal control/plasma method)	1990-96	Fukuda (2)	7,354
	(R&D on synthesis of advanced organic materials/areas of complex photon reactions)	1990-96	Fukuda (12)	1,961
	Study of element technologies involved in manufacture of parts/materials used in electric power plants (research on complex reactions)	1990-96	Fukuda (12)	55,497
	R&D on silicon-based polymer materials (synthesis by chemical reaction)	1991-00	Shiorota (6)	67,500
	(study of material technologies and elucidating characteristics of silicon-based polymers)	1991-00	Shirota (11)	41,800
	Auto-response materials (development of synthetic auto-response polymer materials)	1993-95	Iguchi (9)	21,559
	(development of biopolymer auto-response materials)	1993-95	Minoura (2)	3,910
(New Sunshine)	R&D on coal liquefaction and gasification (research on coal liquefaction catalyst)	1984-	Takehira (12)	55,804
	R&D on leading and basic energy conservation technologies (research on composite reactors provided with advanced separation film)	1987-94	Kanzawa (2)	10,050
	R&D on superconducting materials (wiring of superconducting ceramics by coating thermal decomposition method)	1988-95	Fukuda (5)	2,000
	Research on chemical energy conversion (research on photocatalyst)	1990-93	Takehira (2)	5,839
	R&D on hydrogen energy technologies (research on hydrogen transport by metallic hydrides)	1991-95	Fukuda (3)	11,129
	R&D on leading and basic energy conservation technologies (research on use of excimer lasers to conserve energy in the manufacture of chemical products)	1991-95	Kawamura (5)	7,915
	Development of CO ₂ fixing by artificial photosynthesis (research on recycling technologies based on catalytic hydrogenation of CO ₂)	1991-95	Takehira (3)	6,008

(4) National Institute of Materials and Chemical Research (NIMC) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(New Sunshine) (continued)	Development of decentralized battery power storage system (research on polymer-based lithium battery materials)	1992-01	Kaeriyama (2)	8,776
	Fuel cell power generation (R&D on solid electrolyte fuel cell/Research on wet technologies)	1992-97	Fukuda (5)	2,938
	(R&D on solid electrolyte fuel cell/Evaluation costs)	1992-97	Fukuda (5)	23,941
	General research (research on natural gas [methane] liquid fuel)	1992-96	Takehira (4)	8,142
	Wide-area energy utilization network (research on high-performance materials and process technologies)	1993-00	Kanzawa (11)	3,090
	(research and assessment of high-performance materials and process technologies)	1993-00	Kanzawa (12)	12,000
	Fuel cell power generation (R&D on solid polymer fuel cell/Research on element technologies)	1993-97	Hiratani (4)	1,000
	R&D on energy conservation technologies (exhaust gas denitration catalyst and high-performance denitration catalyst for low fuel consumption engines [mid-high temperature catalyst])	1993-97	Takehira (4)	14,617
	Superconductivity technologies (chemical evaluation of leading ceramic films)	1993-95	Fukuda (5)	10,500
	Fuel cell power generation (evaluate characteristics of solid polymer films)	1993-95	Hiratani (4)	5,010
Chief Researcher	Control of molecular characteristics of polymers used as basic photosynthate material	1990-93	Hatakeyama (1)	2,400
Basic Research	Use of NMR in microstructural research of materials	1989-93	Hiraizumi (4)	2,500
	Computer-based chemical research on interaction of molecular aggregates	1990-94	Tanabe (2)	1,300
	Research involving collection of low-energy electron impact data	1992-94	Horiuchi (1)	1,000
	Research on process by which cluster structures are formed	1993-97	Sugie (4)	1,900
	Research on process by which elements react in gas	1993-96	Kondo (2)	2,000
	Design and fabrication of artificial ribozymes	1993-98	Tanabe (2)	1,300
	Research on synthesis of low-order complex organic compounds and electrical/optical properties thereof	1990-96	Mizuno (2)	1,700
	Photoexcitation radical reactions in microheterogeneous systems	1990-93	Kaise (1)	1,000
	Theoretical research on energetics and dynamics of chemical reactions	1993-97	Tateya (3)	1,400
	Research on basic photochemical processes	1993-97	Tateya (2)	1,600
Molecular Engineering	Research on electron-transfer reactions in monomolecular film and LB film	1991-93	Matsumoto (3)	2,700
	Research on configuration of molecular aggregates	1993-97	Kasuga (4)	3,200
	Research on molecular assemblies	1993-94	Nakanishi (1)	3,100
	Activating small molecules by constructing areas of surface reaction	1990-93	Nofuku (3)	2,700
Chemical Measures	Basic research on ways to evaluate purity of inorganic chemical substances	1991-93	Kurahasi (8)	3,650
	Research to upgrade and standardize methods of elucidating and assessing materials by beam technology	1991-93	Kojima (7)	3,150

(4) National Institute of Materials and Chemical Research (NIMC) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Chemical Measures (continued)	Research to upgrade molecular measurement of polymers	1992-94	Nakahara (3)	2,700
	Research on "intelligent" laboratory automation	1992-94	Nishikawa (1)	1,200
	Research on real time on-site metrology	1992-94	Harada (1)	1,200
	Upgrading separation and analysis of organic compounds	1993-97	Nomura (6)	4,200
	Perfecting a method of structural analysis by particle X-ray diffraction	1993-95	Kurahashi	1,200
Organic Chemistry	Monomerization of biomass components	1990-94	Koyama (1)	1,100
	Research on activation and selective control of CO hydrogenated catalyst	1991-93	Sugi (1)	2,300
	Synthesis and function of glycolipids	1993-96	Ishigami (4)	2,900
	Research on composition, properties, and structure of amorphous carbon materials	1993-98	Murata (1)	1,700
	Research on sequential synthesis and functions of platinum pyrimidine complexes	1993-97	Shimura	900
	Research on advanced composite electrodes	1993-96	Manda	800
	Synthesizing and finding uses for fluorine compounds having low boiling points	1993-95	Murata (4)	1,850
	Synthesizing and finding uses for polymers containing fluorine	1993-95	Kurozawa (2)	1,250
	Use of heteroelement compounds in precision synthesis	1991-96	Tanaka (2)	4,200
	Enzyme-based conversion of lipids having hydroxyl groups	1993-93	Higuchi (1)	1,100
Polymer Chemistry	Analyze makeup and characteristics of polyamino acids produced by microorganisms	1991-93	Kunioka (1)	2,500
	Photochemical reactions of α, ω -C aryl polyenes	1992-94	Yoshihiraki	1,600
	Analysis of bifunctional silicon reagent characteristics	1992-94	Furusawa	1,600
	Research on photoreforming of polymer surfaces	1993-96	Ujigawa (1)	1,600
	Research on rare metal organosol stabilized by surface acting agents	1993-95	Nakao	1,500
	Research on optical and electronic function control of organic film	1993-95	Minami (3)	2,500
	Synthesis of very low temperature elastomers	1993-94	Tsuchiura (1)	2,000
Polymer Physics	Research on analysis and use of microenvironment of lipid molecule aggregates	1991-93	Baba (1)	1,600
	Research based on topology of fluorene structures	1993-94	Nakano	2,000
	Elucidation of hydrophobic monomolecular film surface by measuring intermolecular surface forces	1993-97	Hato (1)	3,000
	Orientation and high-order structural control of straight-chained molecule vapor-deposited film	1993-95	Shimizu (1)	3,000
	Geometry of multi-body dynamics	1993-95	Okamoto (1)	3,000
	Research on precision measurement and control of vaporized molecules	1993-94	Yase (3)	2,300
Functional Surface Chemistry	Research on paraffin activating catalysts	1993-96	Miki (1)	3,200
	Synthesis of functional inorganic materials by sol gel method	1992-94	Mizukami (4)	4,500
	Research on designing catalysts by computer	1992-94	Ito (1)	3,900
	Research on technology for functionally analyzing and assessing materials by light radiation	1991-94	Nishijima (5)	4,100

(4) National Institute of Materials and Chemical Research (NIMC) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Extreme Reactions	Basic research on the production and utilization of super high-density energy	1990-93	Fujihara (4)	2,600
	Structural research on carbon using vibrating spectral separation method	1992-95	Shimizu (3)	2,600
	Molecular design of high-energy substances and dangerous explosive materials	1992-94	Matsunaga (1)	1,500
	Research on impact chemical synthesis of intermetallic compounds	1992-95	Nakayama (1)	1,200
	Research on synthesis of organic functional materials containing nitrogen and sulfur	1990-94	Shibutani (3)	1,700
	Research on specific photochemical reactions	1993-95	Yabe (4)	2,800
	Research on reaction and diffusion systems having a hierarchical structure	1993-95	Kawamura	1,300
Organic Materials	Research on mutually distinct 2D functions based on saccharine and protein molecular systems	1992-96	Yamazaki	1,200
	Research on interrelation of structure and function in organic materials	1993-97	Minoura (4)	3,100
	Research on design of oriented organic materials	1993-96	Kumatani (3)	2,600
	Research on transport and adsorption phenomena in polymer solid/low molecular systems	1993-96	Shinagawa	1,200
	Research to upgrade functions of paper	1991-95	Kamiya (4)	2,700
	Research on separation film on the basis of molecular engineered designs	1993-00	Yamada	1,300
	Application of thermodynamic data base in material chemistry	1991-94	Horita (4)	2,500
	Basic research on development of inorganic composites used as substitute for hard biological tissue	1990-93	Kameyama (2)	3,500
	Research on synthesis, structure, properties, functions of specific organic substances	1991-95	Soma (5)	3,400
	Synthesis of electrode catalyst by reforming carbon fiber surface	1991-93	Kondo (4)	3,200
	Research on characteristics of inorganic chemical systems containing stable free radicals	1993-94	Ueda	1,500
	Intercalation reactions in inorganic materials	1993-94	Akiha (3)	2,000
Polymer Materials Dept.	Research to upgrade separation ability of functional material	1992-94	Mizoguchi (3)	3,200
	Analysis of functional characteristics of heterogeneous materials	1990-93	Yamanaka (1)	2,100
	Research on appearance of sophisticated structures by interaction of polymer electrolytes and water	1992-95	Hatakeyama	1,700
	Melting and solidifying mechanisms in formation of polymer composites	1992-95	Kitana (2)	1,700
	Research on phase behavior of polymer mixtures	1993-95	Senzawa (1)	1,600
	Research on support system for measuring and evaluating composite materials	1992-94	Shibutani (2)	2,200
	Research on technology for evaluating the internal structure of composites	1993-95	Funahashi (1)	1,600
Composite Materials Dept.	Ion sensitive mechanism in ion selective electrode based on modifier electrode	1992-97	Okada (2)	950
	Research on processing of new composite materials	1992-95	Yano (6)	4,150
	Research on non-linear function revealing structures	1992-94	Ogasa (3)	1,700

(4) National Institute of Materials and Chemical Research (NIMC) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Composite Materials Dept (continued)	Research on simulating breakdown dynamic of composite layered structures	1992-94	Kenji (3)	2,200
	Surface reforming of metal compounds by wet method	1993-97	Ogata (3)	2,500
	Laser-assisted formation of composite film	1993-97	Umihara (1)	1,400
Chemical Systems	Research on CO ₂ balance in air, sea water, and limestone	1992-94	Okubo	1,200
	Extraction of large fluorene by high-pressure solvent extraction method	1993-95	Oshima (3)	800
	Research on organic deposition and microorganic corrosion of pipelines	1993-95	Sasaki	1,200
	Research on CO ₂ separation film	1991-94	Kanzawa (7)	900
	Research on chemical film formation by vapor-deposition polymerization method	1991-93	Yanagishita (2)	700
	Research on selective hydrogenation in which film permeable hydrogen is used	1991-93	Ito (1)	600
	Research on uses of photocatalyst	1991-93	Tanaka (1)	900
	Design and preparation of complex particles	1992-96	Iizaki (5)	3,500
	Research on properties of new refrigerants	1992-94	Kanzawa (4)	800
	Research on dynamic interfaces of non-linear chemical systems	1993-95	Sata (5)	1,000
	Research on liquid structures of supercritical liquids	1991-95	Sato (4)	800
	Promoting evaporation of fluid liquid film in viscous fluids	1991-93	Nakajima	1,100
	Research on separation control by molecular aggregates	1993-95	Sugiura (2)	2,200
	Research on chemical system to tackle global warming	1991-93	Shindo	1,200
	Research on separation/decomposition of toxic chemicals	1991-93	Tanaka (3)	2,200
	Research on adsorptive reactions in aqueous solutions	1992-96	Tokunaga	600
Polymer Chemistry	Research on non-linear photomolecular devices	1993	Asai (14)	Unknown
Organic Synthetic Chemistry	Basic research on development of highly selective chemical reactions	1993	Shirota (15)	Unknown
Organic Materials	Research on spontaneous reorienting materials	1993	Hiratani (12)	Unknown
Extreme Reactions	Basic research on fabrication of new materials based on thermodynamic data base	1993	Kawamura (14)	Unknown
Inorganic Materials	Basic research on synthesis and functional control of artificial lattices	1993	Fukuda (16)	Unknown
Polymer Materials	Research on theoretical construction of polymer materials for design and evaluation purposes	1993	Iguchi (13)	Unknown

(5) Government Industrial Research Institute, Osaka (GIRI, Osaka)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on way to evaluate shock damage in structural composites	1992-94	Komaki (3)	11,629
	Research on control of interface conductivity characteristics of composite functional ceramics	1990-94	Nakamura (5)	11,923
	Research on control of optical characteristics of halide glass	1990-93	Tanaka (3)	12,282
	Research on molecular systems having a sensing capability	1990-93	Yoshikawa (5)	12,143
	Research on elements in organic film having optical functions	1991-94	Miya (8)	13,915
	Research on applications of new nanocomposites made from intergraphite compounds	1992-94	Sawada (3)	11,482
	Research on structural control of interpenetrating compounds	1992-94	Tanaka (4)	12,031
	Research on role of dynamic mechanism in uncovering material functions	1993-95	Nagata (6)	35,295
	Research on high-temp fiber-reinforced ceramics	1991-93	Iwasa (7)	16,989
	R&D on forming advanced crystal by ion beam	1993-95	Fujii (4)	8,231
	Natural analog research on leaching behavior of glassified blocks	1989-93	Yamanaka (3)	12,153
	Research on decomposition of hard-to-decompose toxic organic chemicals by catalytic oxidation	1990-94	Higashi (5)	19,262
	Research on combination catalytic systems for reducing diesel NO _x	1991-95	Azuma (4)	9,289
	Development of special biological treatment process for rubber and plastic wastes	1991-94	Yamamoto (4)	10,061
	Research on technology for dealing with inland water pollution caused by toxic organic compounds	1992-95	Nakanishi (4)	12,046
	Research on water purification by activated charcoal	1992-94	Soma (4)	9,731
(Industrial Technology)	Evaluation of high-current/high-field superconducting materials (evaluation of manufacturing processes)	1988-97	Yamashita (3)	21,000
	R&D on non-linear photoelectric materials (elucidate and assess material sources)	1989-98	Nagata (15)	19,465
	Developing element technologies for advanced equipment used in manufacture of parts/materials for electric power plants (evaluate methods of manufacturing parts and materials used in electric power plants)	1990-93	Okuyama (6)	13,390
	R&D on manufacturing sophisticated chemical products (using marine life)	1988-96	Nagata (3)	7,900
	(basic technologies involved in using marine life)	1989-96	Nagata (5)	6,900
	(technologies pertaining to identifying and elucidating useful biofunctions)			
	R&D on propulsion system for supersonic transport (total system R&D)	1989-96	Yamashita (4)	11,500
	Innovative manufacturing technologies (R&D on manufacturing technologies)	1990-96	Ishikawa (10)	2,942
	Developing ways to assess advanced technologies for manufacturing parts/materials used in power plants (evaluate manufacturing materials)	1991-96	Ishikawa (10)	23,703
	R&D on applying technologies used to measure human sensory characteristics (development of simulator)	1990-98	Okuyama (10)	5,420

(5) Government Industrial Research Institute, Osaka (GIRI, Osaka) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Industrial Technology (continued))	Evaluate ways to improve operating environments of commercial nuclear power plants (developing simulated environment)	1991-98	Okuyama (11)	30,369
	(R&D on measurement of physiological effects)	1991-98	Okuyama (5)	11,622
	Advanced structural control of hybrid inorganic materials (introducing sophisticated elements)	1993	Iwasa (6)	4,286
	Auto-response materials (research on polymer/metal and inorganic compound auto-response materials)	1993		10,750
	R&D on non-invasive system for continuous direct measurement of blood sugar levels	1992-93	Nagata (5)	7,332
(New Sunshine Project)	R&D on H ₂ energy technologies (analysis/evaluation to follow research on H ₂ -fueled turbine)	1993-02	Ishikawa (4)	6,000
	R&D on H ₂ energy technologies/Research on H ₂ manufacturing technologies (research on high-temperature steam electrolysis)	1991-95	Nakahara (3)	6,617
	(research on electrolysis with solid polymer electrolyte)	1991-95		19,663
	Research on H ₂ energy technologies/Research on H ₂ transport and storage technologies (research on H ₂ transport and storage using metallic hydrides)	1991-95	Nakahara (7)	13,567
	Research on H ₂ energy technologies/H ₂ uses (research on energy conversion methods using hydrogen-occluded alloys)	1991-95	Nakahara (6)	9,077
	Commercializing solar power generation system/R&D on peripheral technologies (analysis/assessment of H ₂ -occluded alloy battery)	1993-96	Nakahara (6)	26,759
	General research/Basic R&D on energy technologies (research on overseas transport of clean energy)	1991-95	Nakahara (5)	10,569
	Research on decentralized battery power storage systems (research on high-efficiency batteries and basic materials for lithium batteries)	1992-01	Ishikawa (13)	5,500
	(assess high-efficiency batteries, battery materials, and battery life)	1992-01	Ishikawa (13)	33,747
	R&D on molten carbonate fuel cell (research on new fuel cell materials)	1987-97	Ishikawa (10)	4,036
	(materials testing and evaluation)	1987-97	Ishikawa (9)	115,000
	R&D on solid polymer fuel cell (research on fuel cell material)	1992-95	Ishikawa (5)	1,161
	(fuel cell testing and evaluation)	1992-95	Ishikawa (5)	16,170
	R&D on leading and basic energy conservation technologies (research on use of copper catalysts in energy conservation organic synthesis)	1989-93	Nakahara (3)	9,000
	R&D programs (research on exhaust gas denitration catalyst for low fuel consumption engine)	1993-97	Nakahara (3)	7,308
	CO ₂ fixing based on artificial photosynthesis (research on CO ₂ recycling)	1990-93	Nakahara (4)	11,071
	Research on technologies for separating CO ₂ (research on CO ₂ separation at high temperatures based on multi-layered porous glass film)	1991-95	Tanaka (3)	14,178
Key Regional Tech.	Advanced surface treatment in processing basic materials	1989-93	Okuyama (7)	33,131
	Manufacturing processes for advanced biomaterials	1992-97	Nagata (10)	24,451
	Structural control of functionally complex materials	1993-98	Ishikawa (9)	5,910

(5) Government Industrial Research Institute, Osaka (GIRI, Osaka) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Biofunction Applications	Research on molecular recognition and response functions (research on complement polymer recognition function)	1991-93	Nagata (5)	5,517
Inorganic Functional Materials	Research on constructing complete CO ₂ recycling system	1990-93	Ishikawa (4)	2,500
	Research on synthesis of monochromatic phosphors	1991-93	Setoguchi (1)	2,000
	Catalytic control of carbon fiber/carbon interface	1992-94	Sawada (5)	3,000
	Research on material components of solid electrolyte fuel cells	1993-95	Miyazaki (1)	2,000
	Research on effects of fiber-reinforcement on physical properties of composite materials	1993-95	Nakanishi (3)	2,500
Glass and Ceramic Materials	Basic research on conductive ceramics	1990-93	Yamashita (4)	2,500
	Research on effects of pressure against glass	1991-94	Yamashita (4)	5,600
	Research on advanced composite ceramics in which the polymer precursor method is used	1992-95	Iwasa (4)	3,000
	Observing behavior of glass in heavy gravity environment	1992-94	Hayakawa (4)	2,500
	Research on non-oxide glass forming method	1992-94	Tanaka (3)	2,000
	Research on ion conductivity in sulfide glass	1993-95	Yamanaka (2)	1,700
Organic Functional Materials	Research on biofunctional oligosaccharides	1993-95	Kojima (3)	3,000
	Research on material/biosystem interactions	1992-94	Hayashi (2)	5,000
	Research on long-lived organic electrode materials	1993-95	Ishikawa (3)	2,000
	Research on chemical cycle-type polymers	1993-96	Yamamoto (2)	2,000
	Research on efficient recycling of polymer materials	1993-95	Ogawa (4)	2,500
Functional Applied Chemistry	Research on system for supplying H ₂ for chemical fixing of CO ₂	1990-94	Nakahara (5)	2,500
	Research on chemical uses of metallic hydrides	1992-94	Uehara (5)	2,500
	Research to analyze mechanism by which functions manifest in the liquid electrode interface based on in-situ observation	1992-93	Higashi (4)	3,000
	Basic research on environment-friendly catalysts	1993-97	Kasuga (4)	2,500
	Using solid polymer electrolytes to research catalytic reduction of CO ₂	1991-93	Kokuro (4)	3,000
Material Physics	Research on method for testing creep in carbon-reinforced composites	1993-94	Komaki (3)	2,500
	Using optical stimuli in research on forming functional film	1991-93	Ishida (7)	4,500
	Research on ion beam technology for designing advanced functional surfaces	1992-94	Fujii (4)	4,500
	Research on upgrading pattern recognition based on non-linear optical data processing	1993-95	Matsuoka (6)	3,000
New Materials Technology Center	Research on techniques for designing substances and materials from the atomic/electronic level	1991-93	Okuyama (6)	7,500
	Basic research on environment-resistance of glass surfaces	1993	Hayakawa (10)	Unknown
	Research on identifying functions of clustered glass	1993	Wakabayashi (5)	Unknown
	Research on liquid crystal properties of functional metallic complex	1993	Shimizu (5)	Unknown
	Basic research on fabrication of composite oxide films	1993	Ishida (6)	Unknown
	Research on catalytic uses of antimony compounds	1993	Soma (2)	Unknown

(6) Government Industrial Research Institute, Nagoya (GIRI, Nagoya)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on surface functions in ceramics with the aim of biofunctional control	1991-95	Toriyama (5)	11,546
	Research on evaluating materials by NMR imaging	1989-93	Okazaki (2)	7,128
	Research on particle coating by local hydrolytic reactions	1990-94	Santo (7)	8,615
	Research on control of ion exchange characteristic in smectite	1990-93	Mori (6)	7,076
	Research on microlamellar materials	1991-95	Awano (3)	8,349
	Research on processing composite particles	1992-96	Ushiki (10)	14,650
	Research on slurry molding methods for ceramics	1992-96	Kosaka (4)	12,250
	R&D on fluorine-based optically active liquid crystal material	1992-95	Abe (4)	12,314
	Research on characterization of ceramic composites by the analytic method	1993-95	Kamimino (5)	12,890
	Research on material surface control using beams	1993-95	Miyakawa (5)	12,973
	R&D on semi-molten molding of fire-resistant magnesium alloy (research on semi-molten molding of super light-weight active metals)	1993-95	Miwa (4)	12,979
	Research on design and manufacture of high-grade cast products	1993-95	Ninomiya (5)	1,768
	Research on high-temp fiber-reinforced ceramics (fiber-reinforced ceramics in which organic silicon polymers are used)	1991-93	Nakano (5)	1,000
	Research on production, transportation, and alteration of acid rain	1990-93		
	Research on pressurized joints in new materials	1991-93	Machida (5)	6,192
	Research on new processing technology for limiting the elution of lead in ceramics	1993-95	Mori (12)	6,502
	Research on radiation damage to organic materials under simulated fusion reactor conditions	1992-96	Toriyama (2)	13,115
	(costs required to prevent radiation damage)	—	Toriyama (2)	5,906
	(costs required to maintain/operate specific equip)	—	Toriyama (2)	8,000
(Industrial Technology)	Evaluate high-current/high-field superconducting materials Manufacturing process technologies (assess microstructural control)	1989-95	Tabata (9)	55,000
	R&D on advanced materials that exhibit outstanding environmental resistance Research on intermetallic compounds (basic technologies on powder forms)	1989-96	Kondo (4)	16,645
	R&D on innovative manufacturing technologies R&D on ultra-fine crystalline control methods (charged beam assist method)	1990-96	Saito (6)	9,316
	Advanced control of hybrid inorganic materials Basic technologies for advanced processes	1993	Kanzaki (18)	20,024
(New Sunshine Project)	R&D on energy-saving technologies Ceramic gas turbines R&D on heat-resistant ceramic parts and materials (research to develop high-performance gas turbine using heat-resistant ceramic parts and materials)	1988-96	Kubo (6)	2,048
	(evaluate ceramic parts and materials)	1989-96	Kubo (8)	28,679

(6) Government Industrial Research Institute, Nagoya (GIRI, Nagoya) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(New Sunshine Project (continued))	R&D on basic and leading energy technologies Research on refining technology for aluminum scrubbers	1989-93	Matsubara (6)	8,261
	R&D on solar thermal power generation system Research on materials	1990-95	Yoshimura (9)	32,266
	General research Basic R&D on new energy technologies (research on growth control compounds for biomass vegetation)	1991-95	Katayama (3)	8,950
	R&D on new energy technologies Analysis/evaluation to follow research on hydrogen-fueled turbines (analysis and evaluation of H ₂ attack resistant properties of high melting point metals)	1993-00	Kondo (5)	5,000
Key Regional Technologies	New technologies for forming composite materials	1991-93	Nishida (11)	29,312
	R&D on hydroplastic molding of fine ceramics	1993-98	Watanabe (8)	11,838
(Biofunction App.)	R&D on biofunction applications in industry Genetic information and morphological functions (research on control of cell propagation and specialization based on interaction between parenchymal liver cells and endovascular cells)	1992-94	Saito (4)	6,245
Advanced/General Regional Technologies	Research on composition and formation of weak-plasticity porcelain clay	1991-93	Sugiyama (3)	3,414
Joint Public-Private Sector Research	Joint public-private sector research Research on molding near-net shapes by casting method	1990-93	Ninomiya (3)	12,200
Machinery	Research on technology for manufacture of ceramics and ceramic composites	1989-93	Kanematsu (5)	2,262
	Research on effects of high-pressure treatments on solid junctions	1991-95	Machida (2)	1,131
	Research on ultra-high-pressure sintering of super-hard materials	1991-95	Kume (2)	754
	Research on dry processing methods for fine particles	1992-95	Uchiumi (3)	1,508
	Research on processing of basic materials used in aerospace industry	1992-95	Imai (5)	2,262
	Research on decentralized multi-dimensional data processing system	1991-95	Hori (3)	1,508
Metals	Basic research on functional titanium base alloy	1989-93	Yamada (2)	1,131
	Research on development and uses of materials in different states	1989-93	Naganuma (2)	1,131
	Research to develop "intelligent" metallic materials	1990-94	Ashina (9)	3,593
	Research on environmentally safe catalysts	1991-95	Togeda (9)	1,462
	Research to evaluate non-destructiveness of metallic materials	1991-94	Yamada (5)	1,354
	Research on solidification of various metals that have been cast by the vanishing film method	1990-94	Sakaguchi (5)	1,685
	Research on injection molding methods for new untreated powders	1989-93	Nozaki (2)	954
Chemistry	Research on microbeam analysis	1990-94	Kamimino (5)	1,885
	Research on functional reagents	1991-93	Yoshikawa (1)	566
	Research on preserving the environment by biofunctional means	1992-95	Saito (2)	1,131
	Research on metal coating method for fine ceramic powder	1991-93	Shimizu (2)	565

(6) Government Industrial Research Institute, Nagoya (GIRI, Nagoya) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Chemistry (continued)	Research on new method for synthesizing multi-fluorinated organic compounds	1992-95	Abe (3)	1,508
	Research on methods of synthesizing partially fluorinated organic compounds	1992-95	Fujii (4)	1,885
	Research to upgrade technologies involved in measuring environmental factors	1989-93	Tanaka (2)	1,131
Radiation	Research on state analysis and reaction processes by magnetic resonance method	1990-94	Toriyama (3)	1,508
	Research on interaction between an ion beam and solid surfaces	1990-94	Miyakawa (6)	1,696
	Research on functional materials that are environmental-resistant	1990-94	Matsui (2)	943
	Research on composition and properties of multi-layered composites	1990-94	Sakami (1)	754
	Research on molecular transfer in places where ceramic particles react	1990-93	Suzuki (4)	1,508
	Research on functional inorganic materials by high-energy electron beam	1991-95	Takeda (2)	1,131
	Research on low-temperature and extremely low-temperature physics and chemistry	1991-95	(1)	754
	Research on use of ion beam in film forming process	1991-94	Saito (4)	943
	Detailed study of effects of radiation on the environment	1990-94	Hata (2)	943
Basic Ceramic Technologies	Research on improving performance of inorganic composite materials	1989-94	Nakano (2)	942
	Research on high-melting-point ceramic materials using a solar furnace	1989-93	Yamada (4)	1,319
	Research on upgrading functions of electronic ceramics	1991-95	Torii (5)	2,262
	Research on microstructural control of ceramics	1991-95	Kanzaki (7)	3,016
	Research on manufacturing technology for high-performance ceramics	1991-95	Murase (3)	1,508
	Analysis of micropulverization process	1991-94	Suzuki (7)	3,016
	Research on composite clusters	1992-95	Yoshimura (6)	1,885
Applied Ceramics	Research on effective uses for various clays	1990-94	Ueda (4)	942
	Research on effective uses of industrial wastes	1992-94	Ueda (7)	943
	Research on ceramics by controlling crystal phase	1989-93	Sugiyama (2)	1,131
	Research on molding technology for ceramics	1991-95	Nagae (16)	6,409
Chemistry	Basic research on measuring and assessing super environment-resistant materials under extreme conditions	1993	Sakada (20)	Unknown
Applied Ceramics	Basic research on extraction characteristics of amorphous inorganic industrial wastes with an eye toward advanced recycling methods	1993	Watanabe (9)	Unknown
Chemistry	Research on programmed cell death of mature cells	1993	Maeda (6)	Unknown
Basic Ceramic Technologies	Basic research on functionality of ceramic semiconductor particles	1993	Santo (11)	Unknown

(7) National Institute of Bioscience and Human Technology (NIBH)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on ways to measure and assess the attention and movement characteristics of elderly people	1993-96	Kuchinoi (14)	12,804
	Research on form manipulation characteristics in human interfaces	1991-95	Fukui (6)	18,996
	Research to measure and engineer human skill	1990-94	Tanii (6)	15,337
	Research on ways to measure fuzzy data processing in humans	1989-93	Nakamura (9)	11,005
	Research on stabilization of film enzyme reactors	1993-97	Kobayashi (3)	6,052
	Research to develop genetic control technology for plants	1993-97	Shinshi (3)	7,811
	Molecular and theoretical elucidation of biological film and research on sophisticated artificial films	1993-96	Nakanishi (9)	9,000
	Research on control of cell multiplication of core microorganism cells	1990-94	Orita (4)	10,980
	Research on trace moisture-type oxidative biocatalyst	1990-94	Nakajima (3)	6,920
	Research on transfer reaction enzymes and functions thereof	1990-94	Kosugi (2)	10,842
	Research on development of substances that control cell information transmission	1989-93	Tanaka (5)	16,923
	Research on molecular functions and structure of protein units	1993-97	Kamihira (10)	14,251
	Research on molecular system with a sensing capability	1990-94	Ohashi (4)	10,878
	Design and fabrication of innovative biocatalyst by quantum biochemical analysis	1992-94	Tahira	9,982
	Research on mechanisms by which methane is emitted into the atmosphere	1990-93	Nakamura (4)	8,648
	Basic research on biosensors	1993-95	Ohashi (4)	7,767
	Development of replacement materials for tortoise shell by integrating natural polymers	1992-94	Jshida (2)	5,945
	Development of special biological treatment methods for rubber and plastic waste products	1991-95	Tokiwa (2)	19,197
	Development of highly sophisticated system for removing and recovering phosphorous	1992-94	Nakamura (3)	17,016
	Research on technology for analyzing microecosystems with respect to solidification and clean-up of oil spills at sea by microorganisms	1993-97	Higashibara (3)	15,327
	Research on generating and propagating mechanisms of percussive low-frequency sounds and measurement and evaluation thereof	1990-93	Inukai (3)	5,127
	Research on psychological and physiological means of evaluating fluctuating odor	1990-93	Sadoyama (4)	16,130
	Research on developing simple treatment method for highly-concentrated organic effluent	1991-93	Nakamura (4)	1,510
	Collaborative research on sustaining and preserving biological diversity	1993-98	Kuriyama (11)	1,776
	Research on use of synthetic polymers to create advanced functions in physiologically active substances	1991-93	Ohashi (3)	18,002
(Industrial Technology)	R&D on ultra-small biosensors (assess functional protein arrangements)	1989-98	Miyake (7)	49,282
	(analyzing and reconfiguring functional protein and lipid aggregate functions)	1989-98	Miyamoto (2)	11,318
	Production and utilization of complex sugars (basic research on yeast-based complex sugar)	1991-00	Chigami (3)	56,744

(7) National Institute of Bioscience and Human Technology (NIBH) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Industrial Technology) (continued)	(basic research on use of animal cells to synthesize complex sugars)	1991-00	Mitsui (7)	51,080
	(basic research on use of sugar chains to promote functionality of materials)	1991-00	Ohashi (4)	19,440
	Methods of manufacturing advanced chemical products (research on useful lipids)	1988-96	Nakahara (3)	12,060
	(research to elucidate conversion of synthetic organic compounds with microorganisms)	1988-96	Kobayashi (3)	6,120
	(separation and incubation of microorganisms and microscopic algae)	1988-96	Higashibara (3)	12,200
	R&D on applying the methods with which human sensory characteristics are measured (research on analysis and structure of morphology characteristic data)	1990-98	Ohashi (10)	6,000
	Evaluate ways to improve operating environments of commercial nuclear power plants (research on measuring mental-physical stress)	1991-98	Sadoyama (8)	46,508
	(research on ways to measure/analyze complex sensory characteristics)	1991-98	Nakayama (15)	33,212
	Auto-response materials (research on physiologically active auto-response materials)	1993	Okuno (5)	3,910
	Tropical biofunction utilization (R&D on tropical biofunction utilization)	1993-94	Kuriyama (11)	23,388
	R&D on environment-friendly production systems (basic research on ecological design support system for lifestyle-related products)	1993-94	Nakamura (3)	2,990
	Equipment to tackle problems of urinary incontinence (research on non-invasive sensor to measure amount of urine in bladder)	1991-93	Kuchinoi (4)	11,535
	R&D on basic technology to analyze nerve regeneration process (research on development of technique for analyzing nerve regeneration process)	1993-98	Sadoyama (1)	14,912
	R&D on basic technologies of alternative sensorial feedback system to help retrain movement functions	1993-98	Ohashi (3)	14,121
(New Sunshine Project)	Basic research on efficient production of photosynthetic biomaterials	1993-97	Asada (3)	7,530
	Research on biological energy conversion	1993-98	Ohashi (4)	18,311
	Development of CO ₂ fixing by artificial photosynthesis (research on CO ₂ gas fixing based on metallic complex catalyst)	1989-93	Okuno (6)	13,033
	Research on CO ₂ fixing using algae (research on production of algae-based substances that fix and/or reduce CO ₂)	1989-94	Sometani (5)	16,000
	(research on fixing/conversion of CO ₂ using blue-green algae)	1993-96	Miyairi (2)	7,000
	Research on biodegradable chemical substances (development of microbiological water-absorbent biopolymer)	1991-95	Nakamura (3)	12,000
	Research on decomposition of methane, etc. (research on use of microorganisms to convert methane to useful products)	1993-97	Tezuka (2)	6,024
(Biofunction Research)	Research on molecular recognition and response functions (molecular elucidation of sugar chain recognizing function in lectin [1])	1992-94	Chigami (1)	6,055
	(molecular elucidation of sugar chain recognizing function in lectin [2])	1992-94	Harada (1)	6,117

(7) National Institute of Bioscience and Human Technology (NIBH) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Biofunction Research) (continued)	(cancer cell recognition in endovascular cells and response to cancer cell migration [1])	1991-93	Okuno (5)	6,000
	(response on cancer cell recognition and cancer cell migration of endovascular cells [2])	1991-93	Mitsui (3)	4,211
	(research on use of AMF and STM to elucidate interaction of cell skeletal protein and extracellular matrix material)	1993-95	Miyamoto (1)	7,211
	(research on ribozyme as an anti-viral agent and the drug delivery system thereof)	1993-95	Tahira (1)	6,423
	(molecular elucidation of low-temperature shock responses in yeast cells)	1993-95	Mikami (4)	7,095
	(delayed reaction of propagating mechanism of cell propagation signals)	1993-95	Imamura (2)	7,030
	(molecular biological research on innovative enzyme functions in which that act on biofunction control substances)	1991-93	Maruyama (2)	5,642
	(research on membrane receptor molecule recognition mechanism of digestive peptide hormones)	1992-94	Kuniwake (3)	7,809
	(research on dynamic structure of biological film based on nuclear resonance method)	1991-93	Odawara (1)	5,440
	Research on genetic data and morphogenetic functions (research on integrated control mechanism in glycolytic yeast genes)	1992-94	Chigami (2)	7,313
	(research to elucidate functional structure of HDV-type ribozymes)	1993-95	Nishikawa (1)	6,703
	(research on genetic control mechanism in plants and animals based on biological clock)	1993-95	Ishida (3)	7,012
	(genetic control in plants based on oligosaccharide signaling)	1991-93	Shinshi (4)	6,917
	(research on cell propagation and specialization control based on interaction of parenchymal liver cells and endovascular cells)	1992-94	Suzuki (3)	6,117
	(building heat resistance into proteins using thermophilic bacteria)	1992-94	Koyama (2)	6,000
	Research on energy conversion functions (research on high-energy states of microvascular molecular motors)	1991-93	Shimizu (2)	6,118
	(electrochemical conversion of oxidation-reduction catalytic function)	1991-93	Mizutani (2)	5,517
	(crystal growth of film protein)	1993-95	Yasutake (2)	6,913
	Research on perception, recognition, movement, and behavioral control (elucidation of mechanism controlling brightness perception in cerebral optic center)	1991-93	Sagawa	6,000
	(mathematical research on mechanism controlling arm and leg coordination)	1991-93	Hashimoto (3)	5,437
	(research on integrated sense-movement neural information processing mechanism)	1992-94	Akamatsu (4)	7,741
Chief Researcher	Control of high-order brain functions by plastic nerve circuits	1993-97	Nagamura (4)	1,950
Biomass	Research on amino acid sequences and secondary structures of membrane proteins	1993-95	Sakai	450
	Research on structure and function of bio-related materials by NMR method	1993-97	Nakanishi (5)	2,700

(7) National Institute of Bioscience and Human Technology (NIBH) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Biomass (continued)	Research on specific solid structures in functional biological materials	1993-95	Kamihira (4)	2,250
	Research on organic chemistry as it pertains to biofunctions (Phase I)	1993-97	Okuno (5)	3,150
	Research on simulated bioreactions			
	Research to evaluate method of chemically modifying biocompatible polymers	1993-95	Kuniwake (3)	2,250
Biomolecular Chemistry	Research on technology for constructing molecular systems	1993-95	Sora (3)	2,200
	Research on biointerface materials	1993-95	Mizutani (2)	1,900
	Functional and dynamic structural analysis of biomolecular aggregates	1993-95	Ohashi (3)	794
	Basic research on production and design of cell function control peptides	1989-93	Tanaka (4)	3,650
Molecular Biology	Research to use molecular development method to study interrelationship between function and structure in nucleic acids and protein	1993-96	Nishikawa (3)	1,500
	Research on useful host sharing and vector system that facilitates production of protein by yeast	1992-93	Chigami (2)	1,000
	Structural and functional analysis of bioenergy conversion molecular aggregates	1993-97	Takeuchi (2)	2,500
	Basic research on DNA properties and reactivity	1988-93	Shinoda	800
	Research on enviro-response mechanism in plants	1993-97	Shinshi (3)	2,800
Microbiological Functions	Basic research on inorganic gas utilization function by microorganisms	1993-97	Sometama (4)	2,500
	Analysis and application of microecosystem functions in specific environments	1992-96	Higashibara (3)	2,000
	Research on function and development of lipid synthesizing enzymes	1992-94	Nakahara (6)	3,000
	Research on methods of detecting specific microorganisms within complex microorganic groups	1992-96	Nakamura (2)	2,000
	Research on synthesis and decomposition of biodegradable plastics	1990-94	Tokiwa (6)	2,000
Bioreaction Engineering	Basic study on innovative methods of cultivating filamentous fungus	1990-93	Yamabe	1,500
	Basic research on enzyme separation and manufacturing method	1993-97	Kobayashi (4)	2,500
	Improving breeding of alcohol yeast	1987-93	Fujida (1)	1,000
	Basic research on efficiently separating intracellular components	1988-94	Kimura (3)	1,000
	Analysis of metabolic physiology of alcohol yeast	1991-95	Kuriyama (3)	3,000
	Converting specific hydrocarbons by beneficial alkaline microorganisms	1992-93	Nakajima (3)	1,000
Bioinformation Research	Research on molecular function of cell behavior	1992-94	Miyamoto (6)	1,500
	Elucidating structure and function of bacterial flagellous fiber	1992-94	Miyamoto (6)	1,250
	Research on function control substances in animal cells	1993-97	Oka (3)	1,200
	Basic research on cell growth in higher animals	1991-95	Oka (6)	2,000
	Basic research on information processing mechanisms in nervous system	1992-96	Saida (3)	1,100
	Research on sense/perception coordination	1992-95	Saida (1)	700

(7) National Institute of Bioscience and Human Technology (NIBH) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Human Information	Research on methodology for developing models of the recognition process	1993-03	Sasahara (4)	2,660
	Research on non-invasive methods of elucidating biofunctions	1993-98	Sadoyama (6)	3,724
	Research on processing sensory information	1993-00	Kuchinoi (5)	3,192
	Research on learning to control human behavior and the measurements thereof	1993-99	Takeda (6)	3,724
Human Environmental Systems	Research on knowledge-image based design support system	1989-93	Arai	500
	Research on human characteristics involved in designing machinery and equipment	1991-93	Tanii (5)	3,200
	Research data on multi-dimensional sensory information processing functions in humans	1993-97	Shimojo (5)	2,750
	Development of multi-agent model for multiple stereovision function	1993	Takahashi (1)	2,172
	Research on lifestyle efficiencies in housing systems	1991-93	Nakamura (6)	3,650
Microorganism Patent Center	Maintaining traits of patented microorganisms	1990-94	Kawamura (3)	2,928
Bioreaction Engineering	Fundamental elucidation of biological stress response	1993	Komatsu, Tezuka	Unknown
Biomolecular Engineering	Basic research on physiological characteristics of isolated nutritive microorganisms	1993	Asada, Nakamura	Unknown
Biomaterial	Basic research on biofunctional chemistry applications	1993	Tanaka	Unknown
	Basic research on the solid structure of protein and environmental effects	1993	Kamihira, Harada	Unknown
Human Information	Research on use of MRI for measurements in human engineering fields	1993	Kodama	Unknown

(8) Geological Survey of Japan (GSJ)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on mechanism that determines where earthquakes occur	1989-93	Kinugasa (41)	101,929
	Geological, geochemical, and geophysical research on active volcanoes	1989-93	Sudo (22)	15,186
	Geochemical research on behavior of rare elements found in island arc crust	1990-94	Togashi (20)	14,771
	Research on high-density aerial magnetic surveys for precision measurement of tectonic structures	1990-94	Nakatsuka (7)	21,442
	Research on the forming mechanism and prediction of an island arc hydrocarbon potential	1993-97	Tokuhashi (16)	16,296
	Research concerned with exploring/assessing geological regions in Asia	1993-97	Kato (7)	15,562
	Offshore geological research of area surrounding the continental shelf in eastern Sea of Japan	1989-93	Okamura (18)	33,686
	Research on geological circulation in the oceans	1990-97	Nishimura (22)	23,661
	Research on a next-generation remote sensing	1989-93	Sato (6)	11,849
	Research on mechanism by which methane is emitted into the atmosphere	1990-93	Ito (7)	8,647
	Research on phenomenon of nuclear species migration within base rock with respect to deep underground disposal of high-level radioactive waste	1990-94	Kanazawa (9)	29,526

(8) Geological Survey of Japan (GSJ) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research (continued))	Research on upgrading methods of evaluating earthquake resistance in discontinuous base rock surfaces in both the foundation and inclined planes surrounding nuclear power plants	1991-95	Hasegawa (3)	17,699
	Research on methods for purifying polluted bottom sediment in lakes and marshes	1990-94	Iuchi (21)	24,639
	Research to explore/develop underground resources in Mongolia	1991-94	Nakajima (7)	3,963
	Research on coal field and coal formation characteristics	1992-94	Suzuki (3)	5,008
	Research to explore the mineral resources of ocean plate fragments	1992-95	Wakida (4)	3,979
	Research on characteristics of water environments in arid and semi-arid parts of Chinese continent	1993-96	Ishii (4)	5,164
	Research to evaluate behavior and design stability into base rock wall surfaces	1992-96	Takahashi (1)	17,700
(Industrial Technology)	Development of deep underground spaces (tectonic surveys and analyses)	1989-95	Murakami (6)	5,946
	(evaluate, measure, and analyze soft-rock characteristics)	1989-95	Isobe (6)	6,458
	(assess tectonic structure and deep groundwater)	1989-95	Yasuhara (1)	5,779
(New Sunshine Project)	Exploration of geothermal energy (exploration of deep geothermal resources)	1986-97	Ishido (18)	9,049
	Analyze/assess data from research on geothermal exploration methods (analyze/assess exploration of open reserves)	1988-95	Miyazaki (33)	380,911
	(analyze/assess surveys of deep geothermal resource)	1993-97	Tamao (24)	91,188
	Research on CO ₂ fixing by coral reefs	1992-96	Chine (2)	21,087
Geological Research	Research on book of geological maps	1985-96	Yoshida (30)	16,063
	Research on geology	1990-96	Yoshida (10)	9,914
	Research on specific geological maps	1990-94	Kubo (48)	74,687
	Research on geological map editing	1990-94	Makimoto (14)	2,703
	Precision analysis of neopluton cooling history	1992-94	Harayama (1)	1,585
Marine Geology	Research on marine geology	1989-96	Arita (40)	10,659
	Research on ancient geomagnetic field intensity	1991-93	Yamazaki	150
Environmental Geology	General research on geological environment	1989-95	Koide (40)	11,336
	Basic geoscientific research to elucidate origin of life	1992-94	Takada (7)	1,850
Tectonic Heating	Research on tectonic heating	1989-95	Kawamura (28)	9,914
	Earthquake flow detection by tectonic movement	1993-95	Ishido (1)	1,084
	Measuring geoids in lake and inner bay areas by GPS equipped with interferometer	1993-95	Sugihara (4)	858
Mineral Resources	Research on mineral resources	1991-95	Yajima (25)	7,613
	High-temperature volcanic flows and heavy metal mineralization	1991-93	J.W. Hedenquist	200
	Pilot research involving deep drilling of island arc	1992-94	Urabe (7)	990
	Basic research on volatile substances in magma	1993-95	Saito (3)	1,914
	Experimental research to perfect analysis of deep underground amorphous substances and a study of the geochemical behavior thereof	1993-95	Marushige (8)	2,240
	Research on maps of quarry resources	1993-95	Hirano (2)	500

(8) Geological Survey of Japan (GSJ) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Fuel Resources	Research on fuel resources	1988-94	Terajima (11)	3,822
	Research on mechanism by which metal is thickened by organic substances	1991-93	Watanabe (7)	550
	Geochemical research on heterogeneity of hydrocarbon makeup in reserves	1992-94	Kanako (4)	978
Tectonic Physics	Research on tectonic physics	1990-95	Nakatsuka (22)	9,237
	Research on mobile earthquake monitoring system with wide coverage	1991-93	Ouru (3)	278
	Research on basic gravity map	1992-97	Nakatsuka (7)	1,717
Tectonic Chemistry	Research on global and space chemistry	1989-96	Togashi (20)	6,868
	Research on standard rock samples for equipment analysis	1990-94	Ito (8)	2,175
	Geochemical research on trace metals	1991-93	Terajima (3)	500
	Use of laser microprobe in research of stable mineral isotopes	1991-93	Matsuhisa (2)	900
	Research on meteorites to understand process by which planets are formed	1991-93	Hirata (4)	511
International Cooperation	Research on visual imaging system to understand geological environments	1991-93	Kouda (11)	200
	Research on international geological activities	1993-95	Kato (14)	2,807
Geological Information Center	Research on geological and geographical information	1990-94	Okamura (14)	4,848
	Research on surveying method for lakes and marshes	1991-93	Saito (5)	310
	Research on high-precision surveys in which SAR (synthetic-aperture radar) data is used	1993-94	Nakano (4)	1,300
	Research on gas emissions that accompany pulverization of rocks	1993	Matsumoto (2)	1,500
Geological Specimen Center	Research on geological specimens	1990-95	Toyo (11)	5,996
Hokkaido District Office	Research on the geological features and natural resources of Hokkaido	1989-96	Okabe (9)	5,880
	Economic assessment and availability of essential rare metals used in high-tech industries	1992-94	Ota (2)	1,542
Kinki-Chubu District Office	Research on tectonic history and ceramic materials resources in the Kinki and Chubu regions	1991-95	Tsukuda (3)	3,800
Kyushu Geology Center	Research on geological features of the Kyushu area	1992-94	Komura (2)	2,180
Mineral Resources	Research on island arc tectonics and mineralization	1993	Suzuki (10)	Unknown
Environmental Geology	Research on ancient lake and marsh environments of coastal and inland regions	1993	Inazaki (10)	Unknown
	Research on tectonic analysis based on geophysical and geochemical methods	1993	Sato (10)	

(9) Electrotechnical Laboratory (ETL)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on unexamined methods of measuring spatial information	1988-93	Endo (19)	40,000
	Research on establishing a system of electrical standards based on quantum effects and the basic technologies having to do with wave motion standards, i.e. luminous radiation	1989-93	Endo (23)	48,100
	Research on information integration processes in living organisms	1991-96	Suwa (11)	16,800
	Research on innovative configurations for electronic devices	1989-93	Kono (26)	46,100
	Research on electronic characteristics of superstructural substances	1989-94	Kajimura (12)	28,000
	Research on superconducting electronics	1993-97	Kono (16)	35,600
	Research on electronic functions of supermolecule	1990-94	Matsumoto (12)	35,600
	Research on basic X-ray laser technology	1990-95	Yamazaki (11)	49,200
	Research on nanostructures	1992-96	Kajimura (13)	32,500
	Research on fabrication of innovative electronic materials by microscopic interfacial control	1992-97	Arai (31)	49,300
	Research on treatment of material surfaces using a multi-dimensional controlled active beam	1992-97	Tamura (22)	36,200
	Research on advanced uses of space	1993-98	Tamura (23)	52,562
	Research on data processing system for malleable structures	1988-93	Ota (36)	63,100
	Research on autonomous coordination system for actual environments	1990-95	Takase (16)	41,100
	Research on "intelligent" data processing	1991-96	Otsu (22)	47,100
	Research on integrated multi-phase data processing	1992-97	Suwa (26)	55,000
	Research on next-generation advanced production technologies	1991-93	Takase (8)	5,966
	Research on nuclear fusion reactions	1975-96	Suzaki (14)	202,330
	Research to evaluate adaptability of data storage and processing systems in autonomous-type plants	1989-93	Takase (5)	16,933
	Research on oscillation of free-electron lasers	1989-93	Yamazaki (6)	52,404
	Research on superconducting magnet with strong magnetic pulse	1989-95	Onishi (4)	29,875
	Research on methods of evaluating radiation effects and developing standards thereof	1989-98	Yamazaki (26)	64,736
	Research on developing a high-performance radiation detection technology and the applications thereof	1991-95	Yamazaki (3)	14,973
	Research on KrF excimer laser drivers used in nuclear fusion	1991-97	Tamura (8)	88,906
	Research on basic technologies for heat- and radiation-resistant semiconductor elements	1993-97	Yamazaki (10)	25,302
	Research on action plan for robots used in actual nuclear power plant environments	1993-97	Takase (6)	20,453
	Research on upgrading and finding uses for new quantum radiation sources	1993-97	Yamazaki (9)	36,723
	Research on variable-wavelength coherent X-ray light source technology	1993-97	Yajima (5)	21,998
	(costs required to prevent radiation damage)			3,651
	(costs to maintain/operate specific equipment)			78,712

(9) Electrotechnical Laboratory (ETL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research (continued))	Research on psychological and physiological methods for evaluating fluctuating odors	1990-93	Nanjo (8)	23,136
	Research on denitration and deoxidation by electric discharge method	1992-96	Onishi (3)	23,143
	Research on machine translation system to handle translation between neighboring countries	1987-94	Otsu (5)	12,034
	Research on long-range operation of remote-controlled robots	1993-95	Takase (4)	8,317
	Research on multi-functional system that uses temperature differences in atoll regions of the oceans to produce energy	1993-96	Onishi (4)	2,986
(Industrial Technology)	R&D on leading-edge manufacturing systems (R&D on leading-edge manufacturing equipment technologies)	1986-93	Yazaki (2)	9,815
	Development of element technologies for advanced equipment used to manufacture parts and materials for electric power plants (assess beam-generating technologies)	1988-93	Yazaki (19)	36,360
	(assess manufacturing technologies for parts and materials used in power generation plants)	1988-93	Yazaki (5)	10,260
	R&D on applying the methods to measure human sensory characteristics (creating simulated environments)	1990-98	Nanjo (3)	5,530
	R&D on advanced maintenance technologies for electric power plants (assess methods of systemization)	1992-00	Takase (9)	40,000
	(assess 3-D microprocessing methods)	1992-00	Takase (4)	11,500
	(assessing R&D on advanced microelectronic circuits)	1992-00	Kono (25)	140,000
	R&D on bioelements	1986-95	Matsumoto (14)	59,561
	R&D on non-linear photoelectric materials	1989-98	Arai (4)	41,330
	R&D on new software models	1990-97	Suwa (11)	41,844
	Evaluation of high-current/field superconducting materials (assess research on superconducting materials)	1988-97	Kajimura (14)	53,000
	(assess development of superconducting materials)	1988-97	Kajimura (18)	176,000
	(assess characteristics of high-current/high-magnetic field materials)	1989-97	Kajimura (12)	50,000
	(assess manufacturing process technologies)	1990-97	Kajimura (12)	73,000
	Assessing R&D on microscopic biosensors	1989-98	Tamura (2)	8,677
	Basic technical research on health and welfare equipment (R&D on basic technologies of visual information acquisition by the blind)	1993-97	Takase (3)	15,823
	(femtosecond technology)	1993	Kono (7)	32,308
(New Sunshine Project)	R&D on solar energy technologies and solar thermal systems (research on equipment)	1989-96	Onishi (6)	15,095
	Commercializing thin polycrystal solar cells (analyze/assess state-of-the-art photon conversion and utilization technologies)	1989-96	Suzaki (5)	15,000
	(analyze/assess solar batteries)	1989-96	Suzaki (9)	86,206
	Commercializing thin solar batteries (analyze/assess effects of distortion, impurities, etc. on pin layers and interfaces)	1986-96	Suzaki (9)	63,514
	(analyze/assess alloyed amorphous materials and composite solar batteries)	1986-96	Suzaki (23)	205,374

(9) Electrotechnical Laboratory (ETL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(New Sunshine Project (continued))	Analyze/assess development of super high-efficiency solar cell technologies	1991-00	Suzaki (21)	48,291
	Analyze/assess development of peripheral technologies (analyze/assess innovative storage batteries)	1989-96	Suzaki (5)	8,748
	(analyze/assess solar power generation systems)	1989-95	Suzaki (14)	50,003
	General research/Sunshine Project-related research (basic R&D on power generation systems based on ocean temperature differential)	1990-96	Onishi (4)	17,146
	General research/Sunshine Project-related research (research to evaluate the development of new energy technologies)	1993-94	Onishi (5)	4,210
	R&D on global environmental technologies (research on CO ₂ fixing by coral reefs)	1993-96	Onishi (4)	12,000
	Research on decentralized battery power storage system (assess future high-efficiency batteries)	1992-01	Onishi (10)	16,351
	R&D on fuel cell power generation (R&D on dry-type solid electrolyte fuel cells)	1992-97	Onishi (9)	4,784
	(R&D on power-generating performance of solid electrolyte fuel cells)	1992-97	Onishi (9)	46,000
	R&D on superconductivity applications (R&D on superconducting wiring material)	1988-98	Onishi (9)	3,000
	(R&D on superconducting generators)	1988-98	Onishi (8)	3,500
	(research on total systems)	1988-98	Onishi (5)	4,964
	Assess R&D on superconductivity applications (assess characteristics of superconducting materials)	1988-98	Onishi (8)	71,913
	(analyze/assess stability of rotator magnets)	1988-98	Onishi (10)	92,475
	(assess capability of refrigeration systems)	1988-98	Onishi (5)	44,020
	R&D on basic and leading energy technologies (research on sodium fuel conversion)	1988-93	Onishi (9)	10,520
	(research on two-component heat medium power generation system)	1989-93	Onishi (3)	9,210
	Investigative research on energy-saving technologies (research to predict/assess energy-saving technologies)	1993-97	Onishi (5)	3,006
(Biofunction Research)	Research on perception, recognition, movement, and behavioral control (research on process by which subjective visual information is processed inside the brain)	1991-93	Matsumoto (2)	6,049
	(research on non-invasive technologies for measuring images inside each hemisphere of the brain)	1991-93	Matsumoto (2)	7,698
	(research on regeneration of neural networks)	1991-93	Matsumoto (3)	8,232
	(visual movement control)	1992-94	Matsumoto (3)	15,505
	(using optometric methods to assess functional structures in the cerebral cortex and movement-related areas of the brain)	1993-95	Matsumoto (4)	9,802
	(assess neural transmission as part of genetic engineering research on sodium channels in cuttlefish)	1993-95	Matsumoto (3)	8,151
	Research on memory and learning functions (research on morphology of nerve projections with respect to sense of smell)	1991-93	Matsumoto (5)	6,120
	(research on learning function using molecular markers)	1991-95	Matsumoto (3)	8,852
	Research on energy conversion functions (research on flagellous molecular mechanics using X-ray microscope)	1992-94	Matsumoto (6)	11,971

(9) Electrotechnical Laboratory (ETL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Biofunction Research (continued))	Research on "soft" data processing	1992-01	Otsu (9)	8,075
	(research on adaptive vision system)	1992-01	Otsu (6)	19,899
	(research on real-time natural interactive system)	1992-01	Otsu (5)	10,975
	(research on phonetic recognition and comprehension)	1992-01	Otsu (7)	15,036
	(research on "soft" robot technologies)	1992-01	Otsu (8)	17,151
	(research on "soft" associative mechanisms)	1992-01	Otsu (4)	14,864
	Diagnostic system for power plant equipment (assess super-parallel systems)	1992-01	Otsu (11)	15,026
	(research on optical computing systems)	1992-01	Otsu (9)	14,974
Chief Researcher	Basic research on thin-film electronic components	1992-96	Sugi	682
Basic Electronics	Theories of solid-state electronic systems	1991-93	Yamachi (3)	3,800
	Basic research on functionally advanced substances	1990-93	Oyanagi (4)	3,800
	Electronic properties and research on new experimental technologies	1989-93	Nishihara (2)	6,651
	Research on quantum conductivity in quasi-two- dimensional systems	1988-97	Nishihara (1)	800
	Research on quantum effects on microtunneling systems	1993	Nishihara (1)	4,000
	Basic research on angstrom properties	1991-93	Kuroda (1)	4,100
Material Science	Research on fundamental technologies involved in material control	1989-94	Okushi (8)	4,217
	Basic research on nonequilibrium materials	1989-93	Matsuda (3)	3,092
	Research on design, synthesis, and characteristics of new quantum materials	1989-93	Yoshida (6)	4,920
	Research on superconducting materials	1991-93	Ibara (8)	5,904
	Basic research on functional design and properties of optical materials	1989-93	Tani (5)	4,357
Electronic Devices	Research on basic remote sensing technologies	1991-95	Fujisada	1,000
	Research on basic reliability technologies	1991-95	Nakamura	1,000
	Basic research on device functions	1989-93	Sugiyama (9)	7,300
	Research on basic high-temperature device technologies	1992-96	Sugiyama (2)	1,500
	Basic research on semiconductor device configurations	1989-93	Sekigawa (11)	8,450
	Basic research on device processes	1989-93	Shimizu (8)	5,200
	Basic research on charged beam technology	1988-94	Komuro (2)	3,200
	Research on nanometer circuit printing technologies	1990	Komuro (2)	6,000
	Research on new microstructural electronic phenomena	1991-93	Sakamoto (1)	2,400
	Research on new electronic phenomena in super- conductivity	1989-93	Takada (7)	3,450
	Research on physical properties of superconducting mesoscopic wiring	1993-97	Takada (1)	1,258
Supermolecule	Basic research on functional MRI	1993-95	Kamei	934
	Basic research on properties of supermolecule	1989-93	Yokoyama (1)	3,174
	Basic research on supermolecule functions	1993-97	Shimizu (7)	4,830
	Scientific analysis of neural data processing mechanisms	1993-95	Iijima (4)	3,602

(9) Electrotechnical Laboratory (ETL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Basic Metrology	Basic research on superconducting tunneling effect elements	1992-96	Koyanagi (6)	2,876
	Research on basic technology for measuring electrons	1989-96	Kinoshita (7)	6,529
	Basic research on measuring hearing and sounds	1987-96	Sato (6)	4,430
Optical Technologies	Research on new basic laser technologies	1991-94	Miyazaki (5)	4,500
	Research on laser energy applications	1988-94	Makita (8)	6,362
	Research on basic light-guided wave technologies	1988-93	Hidaka (2)	6,400
	Research on precision measurement of optical element parameters	1993	Hidaka (7)	15,000
	Research on basic electromagnetic wave standards	1989-94	Iwasaki (5)	7,000
Quantum Radiation	Basic research on small SOR devices	1989-93	Iwasaki (4)	2,634
	Research on synchrotron radiation	1990-93	Noguchi (2)	2,100
	Investigative research on very low-temperature absolute radiometers	1991-93	Nishi	1,100
	R&D on use of detectors to improve accuracy of photometry and radiation standards	1991-93	Onuki (4)	2,000
	Research on systematizing spectrophotometric constants and international photometric units	1991-95	Onuki (3)	2,500
	Research on maintenance, improvement, and application of radiation standards	1979-95	Suzuki (8)	6,060
	Research on technology for generating high-quality particles (photons) and the uses thereof	1981-95	Misumi (7)	3,160
	Basic research on radiation properties	1989-95	Hayashi (2)	5,390
Extreme Environments	Research on basic vacuum environment technologies	1990-99	Kudo (5)	3,000
	Research on next-generation space energy equipment	1992-99	Kudo (2)	3,100
	Research on element technologies for thermal power generation system in space	1992-93	Kudo (2)	3,000
	Research on high-density energy states using numerical analysis	1989-94	Owadano (7)	4,700
	Research on dynamic characteristics of magnetic lattices in new superconducting materials	1990-94	Kosaka (7)	5,055
	Research on measuring rare particles	1987-93	Ichimura (7)	3,500
Energy Fundamentals	Investigative research to sample findings of R&D on energy technologies	1992-93	Suzaki (9)	500
	Basic technologies concerned with seeding new energy technologies	1992-95	Tanimoto (6)	1,000
	Verification of low-temperature nuclear fusion	1992-94	Tanimoto (2)	900
	Research on properties of high-excitation states	1991-93	Tanimoto (3)	7,578
	Basic research on energy technologies	1989-93	Masuda (3)	3,700
	Research on chemical conversion of light energy by photocatalyst	1992-93	Masuda (3)	6,500
	Research on energy equilibrium of pinch plasma	1980-93	Hayase (1)	4,400
	Research on relaxation phenomena in high-beta plasma	1991-95	Hayase (1)	1,140
	Theoretical research on plasma containment and transport phenomena	1978-93	Hayase (1)	1,000
	Research on pulse power technology	1990-94	Hayase (1)	1,000

(9) Electrotechnical Laboratory (ETL) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Energy Technologies	Basic research on technologies associated with environmental energy systems	1989-93	Tanaka (9)	6,407
	Research on high-efficiency thermal energy direct conversion elements based on macro- and meso-structural control	1992-93	Tanaka (2)	6,500
	Investigative research on new energy conversion technologies	1989-93	Onda (12)	9,213
	Investigative research on strategies for developing energy technologies	1977-94	Onda (1)	1,423
	Applied research on superconductivity phenomenon	1992-97	Tamada (12)	11,529
	R&D on new energy systems	1989-93	Kurokawa (5)	3,460
Information Sciences	Research on trends in information science	1989-93	Suwa	2,400
	Basic mathematical research on information processing	1984-93	Umeyama (6)	3,047
	Research on basic technologies for elucidating brain functions	1991-95	Yamane (4)	2,930
	Basic research on systems technologies to assist in problem-solving when drafting plans	1993-95	Niki (1)	500
	Research to elucidate cognitive process in humans and applications in data processing	1988-97	Niki (8)	4,072
Information Architecture	Basic research on computing mechanisms	1992-97	Higuchi (5)	4,328
	Basic research on parallel processing systems	1991-96	Yamaguchi (9)	5,194
	Research on input-output systems in massive parallel processing computers	1993	Yamaguchi (4)	15,000
	Basic research on language and programming	1987-93	Tomura (6)	4,906
	Basic research on data base mechanisms	1989-95	Omaki (6)	4,040
	Basic research on new information processing mechanisms	19??	Tsukamoto (9)	6,204
Intelligence Data Processing	Basic investigative research on processing of intelligence data	1992-94	Otsu	2,700
	Basic research on reasoning	1990-94	Sato (6)	3,847
	Basic research on natural language	1989-98	Motoyoshi (7)	4,463
	Basic research on production and perception of sound	1992-95	Tanaka (6)	4,155
	Basic research on pattern comprehension mechanism	1991-96	Yamamoto (8)	4,463
Intelligent Systems	Research on integrated representation of perceptive media	1993-96	Fujimura	500
	Basic research on visual recognition	1991-95	Tomita (7)	4,736
	Basic research on behavioral intelligence	1993-02	Tsukine (8)	5,328
	Basic research on autonomous systems	1992-96	Sakane (6)	3,848
	Basic research on interactive systems	1990-95	Hirai (6)	3,853
Osaka Life Electronics Research Center	Research on mutual information transmitting mechanism of living organisms	1993-94	Takehayashi (2)	7,361
	Research on precision measurement of integrated optical processes	1992-96	Tsunoi (6)	5,861
Deputy Director	Research on research	1991-93	Tamura (6)	2,000

(10) National Institute for Resources and Environment (NIRE)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research to tackle dust problems in closed work spaces	1991-95	Yamamoto (19)	26,850
	Research on the effects of trace components on properties and separation of AO ₂ type oxides	1990-93	Sakamoto (4)	9,185
	Research on intermolecular interaction and separation/reaction characteristics of heterocompounds	1991-94	Shiraishi (8)	13,948
	Research on small high-performance heat exchangers	1992-95	Ogisu (3)	10,390
	Research to assess ore deposit characteristics of cobalt-rich clusters	1990-94	Usami (7)	14,545
	Basic research to elucidate in vivo oxide reaction mechanism and design a model enzyme system	1990-93	Shiraishi (4)	14,438
	Basic research on manufacture of new carbon materials by molecular design method	1991-94	Shiraishi (4)	15,420
	Research to synthesize phyllosilicates and design basic materials by intercalation	1992-95	Sakamoto (4)	10,393
	Creation of advanced rare-metal film from micro-particles	1993-96	Sakamoto (6)	24,332
	Research on laser fabrication of carbon composite clusters	1989-93	Tamori (2)	8,302
	Research on form separation of solid particles	1990-93	Sakamoto (6)	7,964
	Research on production, transportation, and alteration of acid rain	1990-93	Kitabayashi (6)	8,647
	Research on process by which matter is recycled and transported in the north and south hemispheres and development of models thereof	1993-95	Kitabayashi (6)	10,496
	Research on mining safety technologies	1991-94	Yamamoto (16)	14,587
	Research on base rock dynamic of underground radioactive waste treatment spaces	1989-95	Yamamoto (4)	18,057
	Research on decomposition of hard-to-decompose toxic organic chemical substances by catalytic oxidation	1990-94	Hirai (5)	16,437
	Research on structure of coastline areas and ways to assess the cleanup thereof	1990-93	Kitabayashi (4)	16,064
	Research on non-polluting methods of treating and using asbestos wastes	1990-93	Sakamoto (8)	17,909
	Research on treating wastes from high-tech industries	1990-93	Sakamoto (5)	13,412
	Research on mechanism by which low-frequency percussive sounds are produced and propagated and a means of measuring those sounds	1990-93	Yamamoto (17)	18,200
	Research on simultaneous reduction of N ₂ O and NO _x emissions from coal-fired equipment	1991-94	Ogisu (8)	21,552
	Research on the nitrogen cycle with respect to interior bay area sediment	1991-94	Kitabayashi (4)	19,581
	Research on combined catalytic system for reducing diesel NO _x	1991-95	Ouchi (5)	13,279
	Research on decomposition of toxic chemicals in coastal areas	1992-94	Hirai (5)	31,510
	Research on technology to limit production of toxic chemical substances in electrostatic precipitators	1992-94	Yamamoto (9)	28,485
	Research on ways of dealing with contamination of inland water by toxic organic compounds	1992-95	Hirai (3)	10,690

(10) National Institute for Resources and Environment (NIRE) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research (continued))	Research on technology for making sensitive analysis of waste-related organic substances using hybrid methods	1992-95	Hirai (6)	11,994
	Research on highly-selective separation technology for preventing emission of toxic organic compounds	1992-96	Tamori (5)	22,782
	Research on non-toxic denitrification treatment of bioorganic industrial wastes	1993-95	Ouchi (5)	23,040
	Research on high-efficiency catalytic combustion and NO _x reduction in small combustors	1993-96	Ogisu (4)	18,970
	Research on technology for limiting production of toxic substances when incinerating industrial wastes	1992-96	Ogisu (5)	22,446
	Research to develop automated method for measuring the properties of particles emitted from source of release	1993-96	Tamori (4)	22,737
	Research to develop technology which uses photo-catalyst to eliminate atmospheric pollutants	1993-97	Ouchi (4)	18,384
	Research on process by which industrial substances circulate through the coastal ecosystem and a technology for measuring the environmental impact thereof	1993-97	Kitayabayashi (6)	30,757
	Research on preventing gas and coal dust ignition in mines	1990-93	Yamao (15)	2,290
	Research on technology for preventing widespread pollution in the tropical rain forests that often follows mine development	1990-93	Hirai (3)	3,569
	Research on preventing acid rain caused by coal combustion	1991-93	Ogisu (4)	3,631
	Research on methods for predicting air pollution as it pertains to industrial sites	1992-94	Kitayabayashi (6)	3,424
	Research on chemical pollution in Kuwait/Egypt	1993-95	Hirai (9)	1,909
	Research on effective uses of unused tropical biomass	1993-96	Shiroishi (9)	5,989
(Industrial Technology)	R&D on mining system for manganese nodules (research on ways to protect the environment from manganese mining)	1989-96	Kitayabayashi (7)	10,300
	(research on dynamic characteristics of deep sea environments)	1993-96	Usami (4)	23,995
	R&D on technologies for developing deep underground spaces (precision surveys and analysis of underground structures [electromagnetic waves])	1989-95	Yamao (2)	7,564
	(evaluation, measurement, and analysis of soft-rock characteristics [evaluation/analysis technologies])	1989-95	Usami (4)	3,065
	(technologies for evaluating deep groundwater and underground structures [groundwater reduction])	1989-95	Kuriyagawa (4)	5,393
	(automated/unmanned excavation methods [high-efficiency drilling])	1989-95	Usami (6)	4,286
	(long-term stabilization methods)	1989-95	Usami (5)	16,769
	(fire-prevention in deep underground spaces [preventative measures])	1989-95	Yamao (13)	11,272
	Research on ecofactory technologies (recycling high-grade high-efficiency materials)	1993-94	Sakamoto (5)	4,900
(New Sunshine Project)	Research on coal energy technologies (improving efficiency of coal gasification)	1983-95	Shiraishi (8)	6,100
	(research on coal liquefaction and by-products)	1985-95	Shiraishi (12)	43,600

(10) National Institute for Resources and Environment (NIRE) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(New Sunshine Project (continued))	Developing diversified electric power sources (analyze/assess coal gasification data)	1990-98	Shiraishi (7)	34,768
	Research on geothermal energy technologies (research on high-temperature rock crushing and heat extraction methods)	1981-94	Usami (7)	3,000
	(research on excavation of geothermal wells, etc.)	1987-95	Usami (5)	9,000
	Costs to assess diversified power sources (analyze/assess high-temperature rock-heat extraction system)	1989-96	Usami (10)	76,418
	(analyze/assess bottom surveying systems used to excavate geothermal wells)	1992-96	Usami (4)	34,401
	(analyze/assess technologies for extracting deep geothermal resources)	1993-02	Usami (4)	11,220
	(research to evaluate new energy technologies)	1990-93	Shiraishi (9)	3,000
	(research on manufacture of hydrocarbons from high-efficiency CO ₂ gas fixing plants)	1991-95	Ouchi (5)	10,282
	Cost to assess development of diversified electric power supply sources (analyze/assess wind power generation systems)	1991-96	Kitayabayashi (7)	20,750
	Research on fuel-cell power generation (research on solid electrolyte fuel cell exhaust heat recovery system)	1992-97	Ogisu (5)	1,393
	(wide-area energy utilization network)	1993-00	Ogisu (4)	1,054
	Cost to assess development of diversified electric power supply sources (research on solid electrolyte fuel cell exhaust heat recovery system)	1992-97	Ogisu (5)	6,278
	(wide-area energy utilization network)	1993-00	Ogisu (5)	4,000
	Exhaust gas denitration catalyst for low fuel-burning engines (catalytic properties and reaction mechanisms)	1993-00	Tamori (6)	7,308
	R&D on global environmental technologies (CO ₂ reductive reactions)	1989-93	Ouchi (6)	11,087
	(CO ₂ recycling by contact hydrogenation)	1991-95	Ouchi (3)	6,018
	(research on decomposition and effective use of methane by advanced catalytic reaction)	1991-96	Tamori (4)	10,113
	(research on remote sensing of greenhouse gases)	1992-96	Kitayabayashi (9)	9,525
	(research on CO ₂ absorbing power by the oceans)	1992-96	Kitayabayashi (8)	15,071
	(research on mixed turbulent microstructure that accompany deep-sea CO ₂ fixing)	1993-95	Usami (4)	3,031
Heated Material Recycling	Basic research on use of catalysts for environmental clean-up purposes	1992-95	Sashijiku (3)	1,971
	Basic research on CO ₂ trapping and separation materials	1992-95	Sashijiku (3)	1,460
	Research to evaluate effects of heterogeneous reactions on life of chemical substances	1992-94	Sashijiku (2)	500
	Basic research on CO ₂ conversion reactions	1992-94	Saito (3)	2,555
	Research on thermochemical treatment of organic urban waste	1991-93	Yokoyama (5)	2,070
	Basic research on methane fermentation of highly concentrated pollutants	1993-95	Yokoyama (5)	1,960
Thermal Energy Utilization	Research on gas activation of carbon fiber	1992-95	Kitagawa (1)	1,059
	Research on reactions in which nitrous oxide gas is formed	1991-96	Oya (4)	3,050
	Basic research on heat radiation of high-temperature flames	1992-95	Yamazaki (2)	1,900

(10) National Institute for Resources and Environment (NIRE) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Thermal Energy Utilization (continued)	Research on heat transfer and reactions in pressure fluidized bed combustion	1993-95	Joto (3)	1,800
	Research on burning of biomass waste	1992-95	Ogisu (1)	950
	Research on solid electrolyte fuel cell with aim of treating environmental pollutants	1991-94	Joto (1)	1,200
	Research on fuel cells			
	Research on advanced calorimetry	1990-93	Yamamoto (4)	3,000
	Research on transport phenomena in critical regions	1987-93	Kobayashi (1)	650
Atmospheric Environmental Protection	Photochemical research on intermediate products of halide reactions	1991-93	Setoguchi (2)	1,950
	Research on limiting excited complex production	1991-93	Matsuzawa	900
	Photolytic reactions induced by shortwave ultraviolet radiation	1991-94	Wakabayashi (1)	900
	Research on small carbon clusters	1992-94	Shimizu (2)	1,472
	Research on functional catalyst support	1990-93	Mizuno (3)	1,650
	Basic research on controlling adsorption by micro-waves	1992-95	Kobayashi (4)	1,000
	Research on dehydrogenation of low-grade alkane	1993-95	Mizuno (3)	1,000
	Basic research on optical characteristics of source emitted particles	1991-93	Yoshiyama (3)	2,000
	Research on ways of evaluating the effects of organic solvent-based VOC atmospheric pollutants	1992-95	Tanaka	900
	Research on microscopic analysis of IIIB metals by SIMS	1993-95	Oishi	600
Hydrospheric Environmental Protection	Basic research on water-based microecosystems looked at in terms of the carbon cycle	1991-93	Urushigawa (4)	3,450
	Research on film separation reactor characteristics	1991-93	Urushigawa (1)	1,000
	Research on recovering useful products from sugar-related pollutants	1991-93	Masunaga (2)	1,100
	Research on recovering hydrogen gas from organic wastes	1991-93	Kato (2)	700
	Research on effects of pre-ozone oxidation on active carbon adsorption	1991-93	Kato (2)	800
	Research on eliminating toxic chemical pollutants through the use of enzymes	1992-95	Wada (2)	2,038
	Research on selective adsorption treatment of nitric acid	1992-94	Kato (2)	800
	Research on advanced separation method for analyzing underwater toxic chemicals	1990-93	Miyazaki (7)	4,340
Environmental Impact Forecasting	Research on process by which atmospheric pollutants are incorporated into clouds	1991-93	Kitayabayashi (7)	4,656
	Research on model showing circulation of material in the North Pacific Ocean	1990-93	Ishikawa (6)	2,640
	Application of alpha-ray liquid scintillation spectrometry on marine specimens	1993-95	Ishikawa (1)	1,286
	Research on method of measuring the micro-environment of sediment surface layers	1993-96	Ishikawa (1)	468
	Research on method of measuring ΣCO_2 in interior bay areas by electrode method	1993-95	Samukawa (2)	1,504
	Basic research on technique for analyzing IMG/ADEOS data	1991-94	Hayashi (4)	3,240

(10) National Institute for Resources and Environment (NIRE) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Environmental Impact Forecasting (continued)	Research on meteorological conditions in desert areas	1991-94	Gamou (2)	568
	Basic research on heat balancing mechanism between land and water	1991-93	Takami (1)	568
	Research on decomposition of natural organic substances in intertidal zones	1991-94	Matsuo (1)	935
Energy Resources	Research on collecting and systematizing basic data on coal characteristics	1992-95	Saito (2)	1,300
	Research on preprocessing effects on reactivity of coal	1992-95	Saito (4)	3,000
	Research on chemical structures and hydro-gasification characteristics of coal	1991-94	Kaiho (4)	1,800
	Research on liquid hydrogenolysis of polymer hydrocarbons	1992-94	Sato (3)	1,800
	Causing chemical reactions in organic mixtures by ultrasonic waves	1991-93	Sato (1)	1,400
	Research on the control of intermolecular hydrogen transfer reactions	1991-93	Kondo (4)	1,400
	Research on photofissure of nitrogen-oxygen bonds	1992-94	Kodera (1)	1,300
	Thermoplastic synthesis of new carbon materials	1992-95	Makino (2)	2,450
	Fabrication of porous carbon materials from coal and bony heavy oil	1992-94	Toda (3)	1,900
	Basic research on synthesis and carbonation of carbon precursors	1992-94	Yamada (3)	2,455
Raw Material Resources	Basic research on production/processing of particulate material	1991-94	Endo (2)	2,380
	Research on controlling high-density particle slurry	1993-96	Kokubo (2)	1,300
	Research on treating powders with supercritical fluid	1993-96	Iwada (1)	1,300
	Research on separation of microparticles	1992-95	Ito (3)	1,983
	Research on dry fractionalization of bulky waste	1992-95	Oi (2)	2,420
	Research on dissolution and precipitation of metallic compounds	1991-94	Tamagawa (2)	1,920
	Research on products of liquid chemical reactions as medium for organic metallic compounds	1992-95	Saito	640
	Precision controlled synthesis of rare-earth particles by liquid phase method	1993-96	Kobayashi (1)	1,700
	Research on makeup and basic properties of specialized silicate lattices	1991-93	Tsunashima (2)	1,280
	Research to convert hydrotalcite to functional material through intercalation	1993-97	Tsunashima (2)	1,780
	Research on thermoplastic process of forming particle-film	1993-95	Kikukawa (2)	1,483
Tectonic Engineering	Basic research on rock fatigue and degradation characteristics	1991-94	Naruta (2)	950
	Basic research on fluidity of CO ₂ within base rock	1992-96	Ishihara (3)	1,500
	Research on improving efficiency of waterjets in terms of non-linear phenomena	1993-95	Kiyono (1)	1,800
	Research on interaction of wave motion and turbulence	1993-95	Kajishima (1)	600
	Basic research on deep sea sensing technologies	1990-93	Yamazaki (2)	1,500

(10) National Institute for Resources and Environment (NIRE) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Tectonic Engineering (continued)	Research to measure surface cracking by elastic wave method	1993-97	Tenma (1)	400
	Research on increasing the accuracy with which rock pressure is measured	1990-93	Oikawa (5)	3,839
	Basic research on fixed-direction coring technology	1991-93	Karasawa (2)	1,800
	Basic research on automated rock drilling	1991-93	Sarata (1)	1,839
Safety Engineering	Basic research on precision control blasting	1991-94	Katsuyama (2)	1,800
	Research on fracture process caused by changes in underground environment and measurement thereof	1992-95	Katsuyama (2)	1,600
	Research on propagation characteristics of ground tremors	1991-93	Isei (4)	1,800
	Research on human factors in evacuation work	1992-94	Isei (4)	1,900
	Basic research on optical gas sensors	1991-94	Kitahara (3)	1,200
	Physiological study of high air intake temperatures of respiratory devices and development of cooling system	1991-93	Takahashi (1)	1,200
	Research on electrochemical control of metallic surfaces by magnetic fields	1992-95	Nakayama (1)	700
	Basic research on flammability of non-halogen fire-proof equipment and materials	1993-96	Kawano (3)	2,171
	Basic research on effective uses for methane gas waste	1993-96	Haneda (2)	1,301
Hokkaido Center	Basic research on technology for measuring infrasonic waves	1993-95	Koyama (2)	1,950
	Research on ignition threshold of ethylene-air mixtures	1991-93	Ikeda	200
Kyushu Center	Research on electromagnetic uses of underground spaces	1991-94	Shikata (2)	1,014
	Basic research to evaluate sound energy and extremely low frequency sound when explosions are detonated	1993-96	Shikata (6)	2,500
Safety Engineering; Safety Systems Research Lab	Basic research on mechanism by which infrasonic waves propagate through the atmosphere	1993	Isei (3)	Unknown
Heat Material Recycling; Biomass Research Lab	Research to use biotechnology to improve oil producing capability of plant plankton	1993	Yokoyama (4)	Unknown
Heat Material Recycling; Optical Research Lab; Atmospheric Environmental Protection; Excitation Chemistry Research Lab	Basic research on elements that use solar energy that are derived from polycilane molecular chains	1993	Sashijiku (3)	Unknown
Hydrospheric Environmental Protection; Biochemical Research Lab; Environmental Impact Forecasting; Marine Environment Research Lab	Basic research on methods of analyzing mixed microorganism groups by means of agenetic probe	1993	Somekawa (6)	Unknown

(11) Government Industrial Development Laboratory, Hokkaido (GIDL, Hokkaido)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on glycolipid-related enzymes using method which measures new enzyme activity	1991-93	Sekiguchi (2)	10,700
	Research on efficiently producing enzymes derived from higher plant forms	1992-94	Sekiguchi (3)	12,050
	Research on manufacture of functionally complex carbon materials	1992-94	Kawabata (6)	11,960
	Research on designing an organic ultra-fine particle system for reactive areas	1991-93	Kawabata (1)	10,730
	Research on particle surface reforming technology which makes use of centrifugal flow areas	1992-95	Maekawa (2)	8,283
	Research on treating industrial wastes from high-tech industries	1990-93	Maekawa (4)	15,281
	Research on simultaneous reduction of N_2O and NO_x from coal-burning devices	1991-94	Maekawa (2)	16,470
	Research on treating organic toxic compounds by chemical reduction method	1991-95	Sekiguchi (3)	11,156
	Research to develop technology for removing chlorine from plastic wastes	1992-95	Maekawa (4)	17,557
	Research on method of greening using functional soil restoration agents	1990-93	Sekiguchi (4)	1,814
	Research on technology for preventing acid rain caused by coal combustion	1991-93	Maekawa (9)	1,692
	Research on technology for preventing pollution caused by powerful adsorbents	1993-96	Sekiguchi (3)	5,819
(Industrial Technology)	R&D on silicon-based polymer materials (synthesis by gas reaction)	1991-00	Kawabata (5)	31,287
(New Sunshine Project)	Development of coal energy technologies/Research on coal liquefaction (research on liquefaction characteristics based on carbon type and engineering properties)	1975-97	Maekawa (10)	59,000
	Development of coal energy technologies/Research on coal gasification (basic research on carbon types and gasification characteristics)	1975-94	Maekawa (7)	17,507
	R&D on basic and leading energy technologies (development of soft-energy thermoelectric conversion elements)	1993-96	Kawabata (2)	7,500
	Research on exhaust gas CO_2 adsorption using circulating fluidized bed	1990-93	Maekawa (4)	9,068
	Research on deep-sea CO_2 fixing	1991-95	Kawabata (4)	7,501
(Key Regional Technologies)	Research on development of advanced applications for bioresources in cold regions	1992-96	Sekiguchi (12)	10,948
	Advanced combustion methods using microgravity field	1993-98	Maekawa (6)	5,910
(Regional Technical Exchanges)	Research on production and utilization of low-temperature microparticles	1993-95	Maekawa (2)	3,414
Chief Researcher	Characterization of in vivo inorganic substances and uses thereof	1991-93	Ito	630
Natural Resources and Energy Engineering	Research on polynuclear aromatic condensation polymerization	1992-96	Kotanigawa (3)	2,650
	Research on use of thermal energy from wastes	1993-97	Shinkawa (5)	3,180
	Research on method of standardizing processing properties of coal resources	1993-97	Hirama (1)	530
	Research on recycling organic resources	1993-97	Fukuda (4)	2,650
	Research on mixed-phase flow processes	1993-97	Tomita (6)	3,710

(11) Government Industrial Development Laboratory, Hokkaido (GIDL, Hokkaido) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Applied Chemistry	Research to upgrade separation and analysis methods with respect to various substances	1990-94	Haraguchi (2)	1,410
	Research on the manufacture and application of separation materials	1992-94	Ishibashi (2)	1,410
	Research on synthesis of functional organic compounds	1992-96	Morita (5)	2,910
	Research on bioenergetic exchanges in organic substances derived from carbon	1989-93	Ishibashi (2)	940
	Physiological and biochemical research on organisms that thrive in colder regions	1993-97	Sawada (1)	940
	Research on finding uses for low-temperature microorganisms	1991-95	Senzaki (2)	1,410
	Research on efficient conversion processes by living organisms	1993-97	Tanaka (3)	1,410
	Research on active oxygen reactions with living organisms and biological materials	1991-93	Jinriki (2)	940
Material Development	Research on controlling material properties	1993-96	Suzuki (3)	2,120
	Research on functions of heavy metal compounds	1993-96	Unuma (1)	1,060
	Composition and properties of functional inorganic materials	1991-94	Yabe (2)	1,590
	Research on synthesis of silicon-based functional materials based on soft chemistry method	1993-97	Okuno (3)	1,590
	Research on low-temperature properties of rubber composites	1993-96	Kubota (1)	530
	Research on processing of inorganic materials	1987-94	Tsurue (1)	1,060
	Research on technology for evaluating the properties and characteristics of snow tires	1992-95	Hiroki (1)	530
	Research on image processing	1993-97	Ikegami (1)	530
	Research on heat pumps	1993-95	Sayama (2)	1,060
Natural Resources and Energy Engineering	Research on environmental protection with respect to use of energy and natural resources	1993	Maekawa	Unknown
Applied Chemistry; Material Development	Research on biofunction substances	1993	Saiguchi	Unknown

(12) Government Industrial Research Center, Kyushu (GIRI, Kyushu)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on powder method of manufacturing functional superplastic materials	1991-94	Okimoto (2)	12,180
	R&D on super heat-resistant MoSi ₂ composite ceramics	1991-94	Ishihara (2)	18,569
	Research on fabrication of semimetallic separation materials in which sugar and sugar-derivatives are used	1993-96	Sawada (2)	11,000
	R&D on fire-resistant Mg alloys and development of semimolten molding technology	1993-96	Akiyama (5)	10,000
	(i) Fire-resistant Mg alloys			
	Research on technology for bonding metal with ceramics	1993-95	Umebayashi (2)	10,000
	Research on high-temperature fiber-reinforced ceramics	1991-93	Tani (4)	1,000
	Research on new method of separating cesium by redox-type ion exchanger	1993-97	Tanihara	8,875

(12) Government Industrial Research Center, Kyushu (GIRI, Kyushu) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Industrial Technology)	Assessing development of technologies for fabricating carbon composites	1989-96	Yamada (2)	16,800
	Advanced structural control of hybrid inorganic materials	1993	Watanabe (3)	1,285
(New Sunshine Project)	Research on coal processing technologies used in initial liquefaction processes	1984-93	Hirosue (4)	10,311
Key Regional Technologies	Research on hybrid machining system for ceramics	1993-97	Imagawa (6)	11,749
	Structural control of complex functional materials	1993-98	Watanabe (1)	5,910
Leading and General Regional Technologies	Research on biomass treatment based on tropical and subtropical plant life	1993-96	Hirosue (3)	3,414
Public-Private Sector Joint Research	Research on synthesis and functional uses of inorganic lamellar polymers	1990-93	Hara (3)	16,836
Chemistry	Research on smectic liquid crystal	1992-94	Sakagami	1,600
	Research on carbonaceous powder in which pitch is used as raw material	1992-94	Kodama (1)	2,000
	Research on bioreactors in which carbon-based enzyme carriers are used	1991-93	Oniwa (2)	2,500
	Research on textural control of carbon materials	1991-94	Nishikubo (1)	2,100
	Research on organizational control of pitch	1991-94	Imamura	1,700
	Research on internal configuration of artificial film in photosynthetic proteins	1993-95	Koga (1)	2,100
	Research on method of liquefying coal at low temperatures	1992-95	Nakata	1,600
	Research on coal gasification	1993-96	Matsumoto	1,700
	Research on high-density metazoa incubation and organic wastewater treatment	1993-96	Koide	1,700
Machinery and Metals	Research on additional processing for new materials	1992-93	Michizu (1)	2,000
	Research on improving composite characteristics of B2 intermetallic compounds	1992-94	Sakamoto	1,700
Machine Metals	Research on chemical characteristics of amorphous alloys	1993-96	Saito	1,800
	Research on light alloy-based quasi-crystal	1991-93	Hirai (1)	2,100
	Research on particle electroplating	1991-94	Saito (1)	1,000
	Research on powder injection molding	1992-94	Okimoto (1)	2,000
	Research on use of tube drawing process to give specific characteristics	1992-95	Kumigai (1)	2,000
	Research on system for shaping multicurved surfaces by "intelligent" control of flexible rolls	1993-96	Yamashita (1)	2,100
	Research on extrusion process for SiC ^W /Al composites	1993-94	Ueno	1,700
	Research on multi-dimensional environment recognition technology	1990-93	Sanjo (2)	2,400
	Research on high-speed data acquisition and processing systems	1992-93	Ono	1,600
Resource Development	Research on conversion and refining of silicate minerals	1992-95	Kimura (2)	2,500
	Research on high-efficiency ethanol fermentation	1993-96	Ikegami (1)	2,000
	Research on manufacture of slow release particles	1992-95	Yasube (1)	2,100
	Research on makeup of zeolite	1991-94	Yoshida	1,600
	Research to evaluate characteristics of powder paste	1993-96	Ouchiya	1,700

(12) Government Industrial Research Center, Kyushu (GIRI, Kyushu) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Resource Development (continued)	Basic research on extraction molding of laminate building materials	1991-93	Kamio (1)	2,000
	Research on composition and properties of apatite compounds	1993-96	Sukemoto	1,800
	Research on synthesis and functionality of hydrated calcium silicate	1993-96	Inoue (4)	2,800
Materials Development	Research on forming plastic film by sputter method	1991-93	Shibata	1,600
	Research on improving characteristics of β -type sintered compacts	1991-93	Kishi (1)	2,000
	Research on carbonaceous colloids	1991-94	Kamekawa (2)	2,200
	Research on sintering of boron nitride at atmospheric pressure	1990-93	Hagio (1)	2,000
	Hardening of carbon/ceramic composites	1993-96	Ogawa	1,800
	Research on carbon/silicide composites	1993-95	Miyazaki	1,800
	Basic research on uses of porous SiC	1991-93	Komatsu	1,600
	Research on functionality of ceramics	1991-93	Watanabe (2)	2,100
	Basic research on photofunctional materials	1990-93	Takase (1)	2,000
Chemistry	Basic research on functional materials in which biopolymers are used	1993	Koga (4)	Unknown
Natural Resource Development	Research to optimize longitudinal form of cement-based extrusion-molded materials	1993	Mori (3)	Unknown
Material Development	Research on boron-based ceramics	1993	Hagio (5)	Unknown

(13) Government Industrial Research Center, Shikoku (GIRI, Shikoku)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on characteristics of whiskers used in making composites	1991-94	Kitamura (3)	15,816
	Research on long-arm control by miniature active mass dampers	1991-93	Sumitomo (3)	12,297
	Research on technology for manufacturing aluminum plated whisker-reinforced alloy	1992-94	Kitamura (2)	5,507
	Research on finding replacement materials for tortoise shell by integrating natural polymers	1992-94	Nishiyama (4)	5,999
	Research on development of adsorbents for separation/extraction of light element isotopes	1993-97	Kato (8)	15,656
	Research on technology for analyzing microecosystems with respect to solidification and clean-up of oil spills at sea by microorganisms	1993-97	Kobayashi (4) (West lab)	17,235
	Collaborative research on recovering usable resources from brackish water	—	Higashibara (3) (NIBH lab)	15,327
(Industrial Technology)	Assessing laser-assisted ion beam technologies	1990-93	Katsumura (5)	6,226
	Technologies involved in identifying, extracting, and refining useful sugar compounds	1988-96	Kobayashi (4)	8,851
(New Sunshine Project)	Research on methods of forming microscopic particles from natural polymers	1993-96	Nishiyama (7)	9,000
	Analysis/assessment of solar power generation systems	1993-96	Katsumura (4)	3,000
(Key Regional Technologies)	High-energy beam composite formation of advanced parts and materials used at sea	1993-97	Katsumura (8)	11,754
(Leading and General Regional Technologies)	Research on technology for producing a highly functional marine polysaccharide fiber	1993-95	Kobayashi (3)	3,414

(13) Government Industrial Research Center, Shikoku (GIRI, Shikoku) (Continued)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
Systems Technologies	R&D on intelligent underwater thermal processing system	1991-93	Ogawa (1)	2,000
Material Development	Research on production and properties of polysaccharides that control structure	1993-95	Kohika (3)	1,800
	Research on forming advanced surface layers in areas without heat equilibrium	1991-94	Uchiumi (5)	2,250
Systems Technologies	Methods for controlling crystal growth	1990-93	Nagase (3)	1,800
	Interrelationship of structure and function in uranium adsorbents	1993-96	Hirotsu (3)	3,150
	Research on dynamic control of systems having non-linear pendulum	1992-95	Tanaka (1)	1,790
Material Development	Basic research on development of hollow fiber-shaped chitin derived from microorganisms	1993	Kubo (3)	Unknown

(14) Government Industrial Research Center, Tohoku (GIRI, Tohoku)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research to chemically upgrade biomass functions	1989-93	Goto (5)	7,813
	Research to evaluate functional characteristics of ADI	1990-94	Takahashi (2)	8,527
	Research on synthesis and use of lamellar compounds having a mixed-layer structure	1992-96	Goto (7)	10,013
	Research on technology for manufacturing buffer materials used for deep underground disposal of high-level radioactive waste	1993-98	Torii (5)	13,197
(Industrial Technology)	Technology for extracting lipids	1988-96	Goto (6)	4,500
(New Sunshine Project)	Research on development of geothermal materials	1980-94	Ikeuchi (5)	9,347
	Analyze/assess data from development of technologies to expand recoverable reserves	1990-93	Ikeguchi (3)	43,840
(Key Regional Technologies)	Research to make comprehensive evaluation of complex structures based on internal inspection system	1990-94	Ikeguchi (9)	31,938
(Leading and General Regional Technologies)	Research on manufacture of new metallic powder materials	1993-95	Hashimoto (2)	3,414
Chemistry	Basic research on utilization of metallic complex producing reactions	1990-94	Itahashi (4)	2,020
	Basic research on reaction-separation technology by supercritical fluids	1990-93	Saito (2)	3,800
	Research on use of substances derived from living organisms	1992-95	Hatada (1)	990
	Research on structural control of inorganic ion exchangers	1992-95	Hayashi (4)	2,340
	Research on technology for continuous ion separation	1992-93	Mori (1)	620
Machine Metals	R&D on particle-dispersed reinforced materials	1992-94	Hashimoto (2)	1,690
	Research on technique for directly measuring thermal properties of molten states	1993-95	Kimura (3)	1,940
	Research aimed at developing sophisticated materials by SHS method	1993-95	Sada (2)	4,350
	Research on porosity of metal surfaces	1993-94	Kurata (1)	760
	Research on technology for fabricating functional film	1993-94	Sawada (4)	1,290
Chemistry	Research on two-phase gate distribution phenomenon in reagent impregnated resin systems	1993	Matsunaga (5)	Unknown
Machine Metals	Research on surface characteristics of deformable metals	1993	Nanjo (9)	Unknown

(15) Government Industrial Research Center, Chugoku (GIRI, Chugoku)

Dept.	Research Item	Term	Chief Researcher (et al.)	Amount Budgeted (000)
(Special Research)	Research on discriminating/organizing mechanistic elements in simple-cell organisms	1990-94	Kawana (3)	11,289
	Research on control of interface structure of ceramic-metal multilayered film	1992-96	Yokogawa (3)	9,761
	Research on surface evaluation by fractoemission and applications thereof	1990-94	Yokogawa (4)	13,152
	Research on high-efficiency means of manufacturing super heat-resistant materials	1992-94	Yokogawa (3)	6,743
	Research involving wide environmental study of geological changes in the Inland Sea of Japan and appropriate environmental control methods thereof	1990-94	Kawana (5)	90,937
	Research on the effects of stratification on the currents and water quality of inner bay areas	1992-95	Kawana (4)	21,388
	Research on process by which internal industrial substances are recycled through the coastal ecosystem and a technology for measuring the environmental impact thereof	1993-97	Kawana (4)	31,600
	Research on assessing the environmental impact of industrial wastes on tropical coastlines	1993-96	Kawana (4)	3,383
(Industrial Technology)	Methods of manufacturing advanced chemical products from marine life/Technologies pertaining to identifying and elucidating useful biofunctions (technologies for measuring and elucidating attraction and repulsion characteristics of bonding micro-organisms [III])	1988-96	Kawana (4)	5,140
(New Sunshine Project)	Hydrogen energy technologies/Research on safety measures around hydrogen (research on ways of preventing embrittlement of materials around which hydrogen is used)	1992-98	Yokogawa (2)	12,395
	Analyze/assess data following research on hydrogen-fueled turbines (research to perform structural analysis and environmental study of material components of hydrogen-fueled turbines)	1993-02	Yokogawa (6)	3,000
(Key Regional Technologies)	Technologies involved in assessing design and processing with regard to precision molding of multicurved surfaces	1991-95	Yokogawa (4)	29,231
	R&D on generating robot arm control plans	1992-94	Yokogawa (4)	3,414
Ocean Development	Basic research on technology for measuring amount of material transported in coastal regions	1993-96	Higo (3)	2,100
	Research to ascertain the effects of high sea levels in the Inland Sea of Japan	1992-94	Mirotta (4)	2,500
	Basic research on structure of coastal ecosystem	1992-95	Hoshika (2)	1,500
	Chemiluminescent analysis of biologically indispensable elements in the oceans	1993-97	Hoshika (1)	800
	Research on functional uses of ocean ecosystem	1990-93	Yamaoka (2)	4,400
	Analysis of pressure/magnetic response mechanism of microorganisms	1991-94	Yamaoka (1)	800
Production Technologies	Research on technology for molding processed surfaces	1992-95	Yamamoto (2)	1,700
	Research on microstructural and acoustical properties of advanced materials	1993-95	Yamamoto (4)	5,000
	Research on materials that function at low temperatures	1991-94	Yokogawa (5)	2,400
	Basic research on intelligent control mechanisms used in manufacturing systems	1992-96	Okada (3)	2,600
Chief Researcher	Research on energy systems	1992-94	Araki	1,200
Ocean Development	Basic research on conversion of matter in the oceans	1993	Kawana	Unknown
Production Technologies	Research on surface microstructure of inorganic materials	1993	Yokogawa	Unknown

2. Overview of Research Projects—By Subject (Unit: ¥ 1000)

Area of Research	Special Research		Ordinary Research		Total	
	Research Items	Amount Budgeted	Research Items	Amount Budgeted	Research Items	Amount Budgeted
Measurements/Standards	18	307,839	79	158,797	97	466,636
Safety and Security	3	56,250	13	17,415	16	73,665
Earthquake Prediction	1	101,929	2	1,778	3	103,707
Natural Resources/Energy	8	116,780	78	277,736	86	394,516
Ocean Development	3	71,892	8	18,605	11	90,497
Domestic Sciences	4	58,142	10	20,049	14	78,191
Biotechnology	11	110,380	39	71,079	50	181,459
Bionics	6	85,016	18	45,983	24	130,999
New Materials	41	549,202	133	279,169	174	828,371
Polymer Engineering	7	78,739	21	46,450	28	125,189
Reaction/Separation	3	55,030	19	38,800	22	93,830
System Engineering	5	66,501	15	31,681	20	98,182
Electronics	8	312,500	37	157,785	45	470,285
Space Development Technology	4	81,118	6	11,871	10	92,989
Information Technology	4	206,300	26	98,902	30	305,202
Industrial Base Technology	10	110,920	62	157,393	72	268,313
Frontier Research	7	89,638	0	0	7	89,638
International Research	2	197,940	3	51,383	5	249,323
Subtotal	145	2,656,116	569	1,484,876	714	4,140,992
International Joint Research	10	107,062	0	0	10	107,062
Mining Safety	1	15,992	0	0	1	15,992
Small-Med Corp Technology	8	50,823	0	0	8	50,823
Peaceful Atomic Energy	25	887,776	8	20,043	33	907,819
Pollution Prevention	40	1,027,306	30	46,178	70	1,073,484
International Industrial Technology	29	125,961	0	0	29	125,961
Coop. Research	2	13,810	0	0	2	13,810
Subtotal	115	2,228,730	38	66,221	153	2,294,951
Total	260	4,884,846	607	1,551,097	867	6,435,943

Note: Includes basic research items in special science and technology coordination fund

3. Individual Research Projects Listed by Subject

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Standards and Measurements	Research to evaluate ITS-90 consistency at room temperature	1991-94	NRLM	15,543
	Research on atomic beam type cesium frequency standard	1991-94	NRLM	18,074
	Research on ultra-clean spatial measurements	1991-93	NRLM	15,061
	Research on high-precision molecular spectral probing method for frequency/wavelength standard	1992-96	NRLM	17,063
	Research on basic phase-conjugated photometry	1992-95	NRLM	14,050
	R&D to upgrade automation and control technology for calibrating weighing equipment	1992-95	NRLM	14,183
	Research on super high-resolution spectral diffraction based on neutron-ion cooling	1993-97	NRLM	18,074
	Research to perfect material weight standards	1993-96	NRLM	21,609
	Research on high-precision measurement of trace moisture content in gas	1993-96	NRLM	12,061
	Research on flow standard using very high-precision sonic nozzle	1993-95	NRLM	13,060
	Research on new optical element technology for data processing	1989-93	MEL	8,382
	Research on fabrication of wide range of very high-precision surface shapes	1993-97	MEL	8,250
	Research on preparation and precision measurement of standard chemical reference materials	1990-94	NIMC	11,200
	Research on precision measurement of biomaterials	1991-94	NIMC	12,100
	Research on use of magnetic fields in separating substances and making high-sensitive measurements	1993-96	NIMC	9,400
	Research on ways to evaluate shock damage in structural composites	1992-94	GIRI, Osa	11,629
	Research on new ways of measuring spatial data	1988-93	ETL	40,000
	Perfecting system of electrical standards based on quantum effects and basic technologies involved in spectral emission wave motion standards	1989-93	ETL	48,100
	Research on improving international unit system	1991-93	NRLM	320
	Research on sub-natural spectral separation based on double photoresonance	1991-93	NRLM	1,560
	Research to develop commercial wavelength and frequency standards in near infrared region	1991-93	NRLM	1,880
	Research on iodine-stabilized laser solidification	1991-93	NRLM	1,750
	Research on control/measurement of optical signals	1991-93	NRLM	1,550
	Research to perfect standards for large dimensions	1991-93	NRLM	1,000
	Research on absolute measurement of gravity constant G	1991-93	NRLM	1,300
	Research on basic hard X-ray diffraction, interference, and spectral separation technologies	1991-93	NRLM	1,000
	Research on scanning-type probe microscope	1991-93	NRLM	1,100
	Research on low-temp thermometer calibration	1991-93	NRLM	1,700
	Research on fixed-point correction of Al impurities	1991-93	NRLM	1,000
	R&D to measure high-pressure viscosity and super high-pressure viscosity	1991-93	NRLM	1,670
	Research to evaluate fluidity of fluids in dispersed systems	1991-93	NRLM	1,220

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Standards and Measurements (continued)	Research to evaluate cleaning of prototype kilogram	1991-93	NRLM	2,530
	Research on stable standard power transfer devices	1991-93	NRLM	1,270
	Research on 3D method for evaluating surface shapes	1991-93	NRLM	2,300
	Research on vibration method for precision measurements	1991-93	NRLM	1,300
	Research on control of turbulence to achieve rectifying effect	1991-93	NRLM	2,260
	Research to upgrade means of measuring pressure	1991-93	NRLM	1,700
	Research on reducing error in 3-D measurements	1991-93	NRLM	1,260
	Research to evaluate surface strength characteristics of mechanical components	1991-93	NRLM	1,600
	Research on ways of evaluating electromagnetic resistance in electronic weighing equipment	1991-93	NRLM	1,000
	Development of high-temperature blackbody furnace	1991-93	NRLM	1,600
	Research on environmental sensing using light waves	1991-93	NRLM	2,900
	Research on measuring temperature of trapped ions	1992-94	NRLM	1,050
	Research on manipulating microspecimens by laser	1992-94	NRLM	1,150
	Research to evaluate characteristics of weak superconducting metal junctions	1992-94	NRLM	1,560
	Research on ways to calculate temperature distribution in an object's surface	1992-94	NRLM	600
	Research on ways to evaluate physical data	1992-94	NRLM	400
	Research on functional control of lasers used for dynamic measurements	1992-94	NRLM	3,780
	Research on parametric oscillating pulse laser	1992-93	NRLM	1,200
	Dynamic calibration of weighing equipment	1992-93	NRLM	2,340
	Research on automating international comparison of time standards	1993-95	NRLM	1,850
	Research to upgrade standard wavelength laser	1993-95	NRLM	1,800
	High-resolution spectral separation of gaseous atoms/molecules by CARS and special optical effects	1993-95	NRLM	1,400
	Research on very low-temp steam pressure measures	1993-95	NRLM	2,070
	Study of melting and hardening temperatures of substances with high melting points	1993-95	NRLM	1,980
	Research on fixed-point temperatures in organic systems near room temperature	1993-95	NRLM	1,300
	Research to measure thermal properties of fluids	1993-95	NRLM	1,850
	Research on density standards technology	1993-95	NRLM	1,670
	Research on temperature transfer standards	1993-95	NRLM	3,560
	Research to evaluate dynamic characteristics of sensors using shock	1993-95	NRLM	1,480
	Research to evaluate movement accuracy by tracking-type interferometer	1993-95	NRLM	1,420

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Standards and Measurements (continued)	Research to upgrade optical surface detection	1993-95	NRLM	2,340
	Research to upgrade technologies used to measure flow rates	1993-95	NRLM	1,440
	Multidimensional measurement of light standards	1993-95	NRLM	3,030
	Research on absolute measurement of magnetic quantum by flotation in superconducting electromagnetic field	1993-94	NRLM	1,650
	Research to upgrade calibration, testing, and inspection systems using computers	1993-94	NRLM	1,200
	Research to upgrade measurement of thermal conductivity in liquids and assessing the data obtained therein	1993-94	NRLM	950
	Research on use of holographic elements to measure large-diameter plane mirrors	1993-95	MEL	2,500
	Research on microtribology	1991-93	MEL	2,480
	Basic research on turbulent flame structures	1991-93	MEL	2,200
	Research on microstructure of materials by NMR	1989-93	NIMC	2,500
	Mathematical and chemical research on interaction of molecular aggregates	1990-94	NIMC	1,300
	Application of thermodynamic data bases in material chemistry	1991-94	NIMC	2,500
	Basic research on ways to evaluate purity of inorganic chemical substances	1991-93	NIMC	3,650
	Research to upgrade and standardize methods of elucidating/assessing materials by beam technology	1991-93	NIMC	3,150
	Research on collection of low-energy electron impact data	1992-94	NIMC	1,000
	Research to upgrade molecular measurement methods for polymers	1992-94	NIMC	2,700
	Research on "intelligent" laboratory automation	1992-94	NIMC	1,200
	Research on real time on-site metrology	1992-94	NIMC	1,200
	Research on process by which cluster structures are formed	1993-97	NIMC	1,900
	Upgrade separation and analysis of organic compounds	1993-97	NIMC	4,200
	Research on process by which elements react in gas	1993-96	NIMC	2,000
	Perfect a method of structural analysis by particle X-ray diffraction	1993-95	NIMC	1,200
	Research on method to test creep in carbon-reinforced composites	1993-94	GIRI, Osa	2,500
	Research on microbeam analysis	1990-94	GIRI, Nag	1,885
	Research on functional reagents	1991-93	GIRI, Nag	566
	Basic research on measurement of hearing and sound	1987-96	ETL	4,430
	Research on basic electromagnetic wave standards	1989-94	ETL	7,000
	Research on basic electron metrology	1989-96	ETL	6,529
	Research on basic vacuum environment technology	1990-99	ETL	3,000
	Investigative research on very low-temperature absolute radiometer	1991-93	ETL	1,100
	R&D on use of detectors to improve accuracy of photometry and for radiation standards	1991-93	ETL	2,000

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Standards and Measurements (continued)	Research on systematizing spectrophotometric constants and international photometric units	1991-95	ETL	2,500
	Basic research on superconductive tunneling effect elements	1992-94	ETL	2,876
	Research on precision measurement of integrated optical processes	1992-96	ETL	5,861
	Basic research to evaluate sound energy and very low frequency sound when explosions are detonated	1993-96	NIRE	2,500
	Research on technology for evaluating properties and characteristics of snow tires	1992-95	GIDL, Hok	530
(Basic Research from Special Fund for Promotion of Science and Technology)	Research on technology for precision measurement of microfluid properties	1993	NRLM	Unknown
	Research to improve the accuracy with which multiple components of force are measured	1993	NRLM	Unknown
	Research on wavelength stabilization and control of semiconductor lasers	1993	NRLM	Unknown
	Research on wavelength-swept shape measuring interferometer	1993-94	MEL	Unknown
	Basic research to measure/assess super environment-resistant materials under extreme conditions	1993	GIDL, Hok	Unknown
Safety and Security	Research on chemical uses and stabilization of explosions/percussions	1990-93	NIMC	18,200
	Research on technology to elucidate and prevent specific types of industrial gas explosions	1993-96	NIMC	11,200
	Research to tackle dust problems in closed work spaces	1991-95	NIRE	26,850
	Predicting accidents based on behavior of car groups encountering yellow signal lights	1993-95	MEL	500
	Investigative research on safety of man-vehicle systems	1993-94	MEL	1,380
	Research on propagation characteristics of ground tremors	1991-93	NIRE	1,800
	Physiological study of high air intake temperature in respiratory devices and development of cooling system	1991-93	NIRE	1,200
	Research on ignition threshold of ethylene-air fuel mixtures	1991-93	NIRE	200

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Safety and Security (continued)	Research on electromagnetic uses of underground spaces	1991-94	NIRE	1,014
	Basic research on optical gas sensors	1991-94	NIRE	1,200
	Basic research on precision control blasting	1991-94	NIRE	1,800
	Research on human factors involved in evacuation work	1992-94	NIRE	1,900
	Research on fracture process caused by changes in the underground environment and measurement thereof	1992-95	NIRE	1,600
	Research on electrochemical control of metal surfaces by magnetic field	1992-95	NIRE	700
	Basic research on measurement of infrasonic waves	1993-95	NIRE	1,950
	Basic research on flammability of non-halogen fire-proof equipment and materials	1993-96	NIRE	2,171
Earthquake Prediction	Research on mechanism that determines the location of earthquakes	1989-93	GSJ	101,929
	Research on mobile wide-ranging earthquake monitoring system	1991-93	GSJ	278
	Research on gas emissions that follow rock pulverization	1993	GSJ	1,500
(Special Coord. Fund for S/T)	Research on technology for analyzing underground structures using geophysical/geochemical methods	1993	GSJ	Unknown
Natural Resources and Energy	Geological, geochemical, and geophysical research on active volcanoes	1989-93	GSJ	15,186
	Geochemical research on behavior of rare elements found in island arc crust	1990-94	GSJ	14,771
	Research on high-density aerial magnetic survey for precise measurement of tectonic structures	1990-94	GSJ	21,442
	Research on mechanism by which island arc hydrocarbon potential is formed and the methods of prediction thereof	1993-97	GSJ	16,296
	Research concerned with exploring/assessing the geological environment of Asia	1993-97	GSJ	15,562
	Research on the effects of trace constituents on physical properties and separation of AO ₂ type oxides	1990-93	NIRE	9,185
	Research on intermolecular interaction and separation/reaction characteristics of heterocompounds	1991-94	NIRE	13,948
	Research on small high-performance heat exchangers	1992-95	NIRE	10,390
	Monomerization of biomass components	1990-94	NIMC	1,100
	Research on active-selective control of carbon monoxide hydrocatalyst	1991-93	NIMC	2,300
	Research on CO ₂ balance in air/sea water/limestone	1992-94	NIMC	1,200
	Research on paraffin activating catalysts	1993-96	NIMC	3,200
	Extraction of large fluorene by high-pressure solvent extraction method	1993-95	NIMC	800
	Research on H ₂ supply system for CO ₂ chemical fixing	1990-94	GIRI, Osa	2,500

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Natural Resources and Energy (continued)	Research on constructing total CO ₂ recycling system	1990-93	GIRI, Osa	2,500
	Research on book of geological maps	1985-96	GSJ	16,063
	Research on geology	1990-96	GSJ	9,914
	Research on specific geological maps	1990-94	GSJ	74,687
	Research on geological editing	1990-94	GSJ	2,703
	Precision analysis of neopluton cooling history	1992-94	GSJ	1,585
	General research on geological environments	1989-95	GSJ	11,336
	Basic geoscientific research on origin of life	1992-94	GSJ	1,850
	Research on tectonic heating	1989-95	GSJ	9,914
	Measuring geoids in lake and inner bay areas by GPS equipped with interferometer	1993-95	GSJ	858
	Research on mineral resources	1991-95	GSJ	7,613
	High-temperature volcanic flows and heavy metal mineralization	1991-93	GSJ	200
	Pilot research on island arc deep drilling	1992-94	GSJ	990
	Basic research on volatile substances in magma	1993-95	GSJ	1,914
	Experimental research to perfect analysis of deep underground amorphous substances and study the geochemical behavior thereof	1993-95	GSJ	2,240
	Research on quarry resource maps	1993-95	GSJ	500
	Research on fuel resources	1988-94	GSJ	3,822
	Research on mechanism by which metal is thickened by organic substances	1991-93	GSJ	550
	Geochemical research on heterogeneity of hydrocarbon makeup in reserves	1992-94	GSJ	978
	Research on tectonic physics	1990-95	GSJ	9,237
	Research on basic gravity maps	1992-97	GSJ	1,717
	Research on global and space chemistry	1989-96	GSJ	6,868
	Research on rock samples for equipment analysis	1990-94	GSJ	2,175
	Geochemical research on trace metals	1991-93	GSJ	500
	Use of laser microprobe in research on stable mineral isotopes	1991-93	GSJ	900
	Research on visual imaging system to understand geological environments	1991-93	GSJ	200
	Research on international geological activities	1993-95	GSJ	2,807
	Research on geological specimens	1990-95	GSJ	5,996
	Research on geological features and resources of Hokkaido	1989-96	GSJ	5,880
	Economic assessment and availability of essential rare metals used in high-tech industries	1992-94	GSJ	1,542
	Research on tectonic history and ceramic material resources in the Kinki and Chubu regions	1991-95	GSJ	3,800
	Research on geological features of the Kyushu area	1992-94	GSJ	2,180
	Investigative research to sample findings of R&D on energy technologies	1992-93	ETL	500
	Verification of low-temperature nuclear fusion	1992-93	ETL	900

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Natural Resources and Energy (continued)	Basic technologies concerned with seeding new energy technologies	1992-95	ETL	1,000
	Chemical conversion of light energy by photocatalyst	1992-95	ETL	6,500
	Research on transport phenomena in critical regions	1987-93	NIRE	650
	Research on increasing the accuracy with which rock pressure is measured	1990-93	NIRE	3,839
	Research to upgrade calorimetry	1990-93	NIRE	3,000
	Research on makeup and basic properties of specialized silicate lattices	1991-93	NIRE	1,280
	Basic research on fixed-direction coring	1991-93	NIRE	1,800
	Basic research on automated rock drilling	1991-93	NIRE	1,839
	Causing chemical reactions in organic mixtures by ultrasonic waves	1991-93	NIRE	1,400
	Research on thermochemical treatment of organic urban waste	1991-93	NIRE	2,070
	Basic research on rock fatigue and degradation characteristics	1991-94	NIRE	950
	Research on chemical structure and hydro-gasification characteristics of coal	1991-94	NIRE	1,800
	Research on dissolution and precipitation mechanism of metallic compounds	1991-94	NIRE	1,920
	Research on liquid hydrogenolysis of polymer HCs	1991-94	NIRE	1,800
	Research on photofissure of nitrogen-oxygen bond	1991-94	NIRE	1,300
	Fabrication of porous carbon materials from coal and bony heavy oil	1992-94	NIRE	1,900
	Basic research on CO ₂ conversion reactions	1992-94	NIRE	2,555
	Basic research on heat radiation of high-temperature flames	1992-95	NIRE	1,900
	Research on burning of biomass wastes	1992-95	NIRE	950
	Research on collecting and systematizing basic property data on coal	1992-95	NIRE	1,300
	Research on the effects of preprocessing on reactivity of coal	1992-95	NIRE	3,000
	Research on separation of microparticles	1992-95	NIRE	1,983
	Research on dry fractionalization of bulky waste	1992-95	NIRE	2,420
	Research on products of liquid chemical reactions as medium for organic metallic complexes	1992-95	NIRE	640
	Basic research on fluidity of CO ₂ within base rock	1992-96	NIRE	1,500
	Basic research on methane fermentation of highly concentrated pollutants	1993-95	NIRE	1,960
	Research on dehydrogenation of low-grade alkane	1993-95	NIRE	1,000
	Research on improving efficiency of waterjets in terms of non-linear phenomena	1993-95	NIRE	1,800
	Basic research on effective uses of methane gas waste	1993-96	NIRE	1,301
	Research on treating powders with supercritical fluid	1993-96	NIRE	1,300
	Research on measuring surface fissures by elastic waves	1993-97	NIRE	400

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Natural Resources and Energy (continued)	Research on polynuclear aromatic condensation polymerization	1992-96	GIDL, Hok	2,650
	Research on utilization of waste and thermal energy	1993-97	GIDL, Hok	3,180
	Research on methods of standardizing processing properties of coal resources	1993-97	GIDL, Hok	530
	Research on low-temperature coal liquefaction	1992-95	GIRI, Kyu	1,600
	Research on conversion and refining processes of silicate minerals	1992-95	GIRI, Kyu	2,500
	Research on coal gasification	1993-96	GIRI, Kyu	1,700
	Research on high-efficiency ethanol fermentation	1993-96	GIRI, Kyu	2,000
(Basic Research from Special Coordination Fund)	Basic research on extraction characteristics with aim toward reusability of heterogeneous inorganic industrial wastes	1993	GIRI, Nag	Unknown
	Research on island arc tectonics and mineralization	1993	GSJ	Unknown
	Research to use biotechnology to improve oil production capability of plant plankton	1993	NIRE	Unknown
	Basic research on elements made from polycyclic molecular chains that make use of solar energy	1993	NIRE	Unknown
	Research on environmental protection with respect to use of energy and natural resources	1993	GIDL, Hok	Unknown
Marine Development	Offshore geological research of area surrounding the continental shelf in eastern Sea of Japan	1989-93	GSJ	33,686
	Research on geological circulation in the oceans	1990-97	GSJ	23,661
	Research to evaluate ore deposit characteristics of cobalt-rich clusters	1990-94	NIRE	14,545
	Research on marine geology	1989-96	GSJ	10,659
	Research on ancient geomagnetic field intensity	1991-93	GSJ	150
	Research on surveying methods for lakes and marshes	1991-93	GSJ	310
	Basic research on deep sea sensing methods	1990-93	NIRE	1,500
	Application of alpha-ray liquid scintillation spectrometry on marine specimens	1993-95	NIRE	1,286
	Research on wave motion/turbulence interactions	1993-95	NIRE	600
	R&D on intelligent underwater thermal processing system	1991-93	GIRI, Shi	2,000
	Basic research on technology for measuring amount of matter transported in coastal regions	1993-96	GIRI, Chu	2,100
	Research on ancient lake and marsh environments in coastal and inland regions	1993	GSJ	Unknown
	Basic research on matter conversion in the oceans	1993	GIRI, Chu	Unknown
Domestic Sciences	Research on ways to measure and evaluate attention and movement characteristics of the elderly	1993-96	NIBH	12,804
	Research on form manipulation characteristics in human interfaces	1991-95	NIBH	18,996
	Research on measuring/engineering human skill	1990-94	NIBH	15,337
	Research on ways to measure fuzzy data processing in humans	1989-93	NIBH	11,005
	Research on effective uses for various clays	1990-94	GIRI, Nag	942
	Research on effective uses of industrial wastes	1992-94	GIRI, Nag	943
	Research on sense-perception coordination	1992-95	NIBH	700

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Domestic Sciences (continued)	Research on knowledge-image based design support system	1989-93	NIBH	500
	Research on processing of sensory information	1993-00	NIBH	3,192
	Research on human characteristics for the purpose of designing machinery and equipment	1991-93	NIBH	3,200
	Research data on multi-dimensional sensory information processing functions in humans	1993-97	NIBH	2,750
	Development of multi-agent model for multiple stereovision functions	1993	NIBH	2,172
	Research on lifestyle efficiencies in homes	1991-93	NIBH	3,650
	Basic research on extraction molding of laminate building materials	1991-93	GIRI, Kyu	2,000
Biotechnology	Research on stabilization of film enzyme reactors	1993-97	NIBH	6,052
	Research on genetic control of plants	1993-97	NIBH	7,811
	Molecular theory elucidation of biological film and research on highly functional artificial film	1993-96	NIBH	9,000
	Research on control of cell multiplication in core microorganism cells	1990-94	NIBH	10,980
	Research on trace moisture oxidative reaction biocatalyst	1990-94	NIBH	6,920
	Research on transfer reaction enzymes and functions	1990-94	NIBH	10,842
	Research on development of substances that control transmission of cell information	1989-93	NIBH	16,923
	Research on glycolipid-related enzymes using method that measures new enzyme activity	1991-93	GIRI, Kyu	10,700
	Research on efficiently producing enzymes derived from higher plant forms	1992-94	GIRI, Kyu	12,050
	Research to chemically upgrade biomass functions	1989-93	GIRI, Toh	7,813
	Research on discriminating/organizing mechanisms of elements in simple-cell organisms	1990-94	GIRI, Chu	11,289
	Research on organic deposition and microorganic corrosion in pipelines	1991-93	NIMC	1,200
	Design and fabrication of artificial ribozymes	1993-98	NIMC	1,300
	Research on biofunctional oligosaccharides	1993-95	GIRI, Osa	3,000
	Research on environmental preservation by use of biofunctions	1992-95	GIRI, Nag	1,131
	Research on amino acid sequences and secondary structures of membrane proteins	1993-95	NIBH	450
	Research on structure and function of bio-related materials by NMR method	1993-97	NIBH	2,700
	Research on organic chemistry as it pertains to biofunctions (Phase I)	1993-97	NIBH	3,150
	Research on simulated bioreactions			
	Research to evaluate method of chemically modifying biocompatible polymers	1993-95	NIBH	2,250
	Basic research on production and design of cell function control peptides	1989-93	NIBH	3,650
	Research to use molecular development method to study interrelationship between function and structure in nucleic acids and protein	1993-96	NIBH	1,500

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Biotechnology (continued)	Research on useful host sharing and vector system that facilitates production of protein by yeast	1992-93	NIBH	1,000
	Structural and functional analysis of bioenergy converting molecular aggregates	1993-97	NIBH	2,500
	Basic research on DNA properties and reactivity	1988-93	NIBH	800
	Research on plant environmental response mechanism	1993-97	NIBH	2,800
	Basic research on uses and functions of inorganic gas by microorganisms	1993-97	NIBH	2,500
	Analysis and application of microbiological functions in specific environments	1992-93	NIBH	2,000
	Research on function and development of lipid synthesizing enzymes	1992-94	NIBH	3,000
	Research on methods of detecting specific microorganisms within complex microorganic groups	1992-96	NIBH	2,000
	Research on synthesis and decomposition of biodegradable plastics	1990-94	NIBH	2,000
	Basic study on new methods for cultivating filamentous fungus	1990-93	NIBH	1,500
	Basic research on enzyme separation and manufacture	1993-97	NIBH	2,500
	Improving the breeding of alcohol yeast	1987-93	NIBH	1,000
	Basic research on efficiently separating intracellular components	1988-94	NIBH	1,000
	Analysis of metabolic physiology of alcohol yeast	1991-95	NIBH	3,000
	Specific conversion of hydrocarbons using beneficent alkaline microorganisms	1992-93	NIBH	1,000
	Research on molecular function of cell behavior	1992-94	NIBH	1,500
	Elucidating structure and function of bacterial flagellous fiber	1992-94	NIBH	1,250
	Research on function controlling substances in animal cells	1993-97	NIBH	1,200
	Basic research on cell multiplication in higher animals	1991-95	NIBH	2,000
	Maintaining traits of patented microorganisms	1990-94	NIBH	2,928
	Characterization of in vivo inorganic substances and uses thereof	1991-93	GIRI, Toh	630
	Research on bioenergetic exchange in organic substances derived from carbon	1989-93	GIRI, Toh	940
	Physiological and biochemical research on organisms that thrive in colder regions	1993-97	GIRI, Toh	940
	Research on utilization of low-temp microorganisms	1991-95	GIRI, Toh	1,410
	Research on efficient substance conversion by living organisms	1993-97	GIRI, Toh	1,410
	Research on active oxygen reactions with living organisms and biomaterials	1991-93	GIRI, Toh	940
	Research on production and properties of polysaccharides that control structure	1993-95	GIRI, Shi	1,800
	Research on functional uses of ocean ecosystem	1990-93	GIRI, Chu	4,400
	Analysis of pressure/magnetic response mechanism of microorganisms	1991-94	GIRI, Chu	800

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
(Basic Research from Special Science and Technology Promotion Fund)	Research on programmed cell death of mature cells	1993	GIRI, Nag	Unknown
	Fundamental elucidation of biostress responses	1993	NIBH	Unknown
	Basic research on physiological characteristics of isolated nutritive microorganisms	1993	NIBH	Unknown
	Basic research on applications of biofunction chemistry	1993	NIBH	Unknown
	Research on biofunction substances	1993	GIDL, Hok	Unknown
Bionics	Biomechanical research concerned with alternatives bone formation functions	1990-94	MEL	13,672
	Research on biomimetic devices	1992-96	NIMC	14,309
	Synthesis and function of glycolipids	1991-95	GIRI, Nag	11,546
	Research on surface function ceramics as it pertains to biofunction control	1993-97	NIBH	14,231
	Research on molecular function and structure of protein units	1991-96	ETL	16,800
	Research on information integration process in living organisms	1990-93	NIRE	14,438
	Basic research to elucidate in vivo oxide reaction mechanism and design a model enzyme system	1993-95	MEL	1,900
	Research on manufacture of nerve specimens for use in polishing	1992-94	MEL	1,300
	Elucidating processes by which bone and joint tissue are damaged and repaired	1992-94	MEL	2,100
	Basic research on integration of sensory and movement functions	1992-96	NIMC	1,200
	Research on mutually identifiable 2D functions based on saccharine and protein molecule systems	1993-96	NIMC	2,900
	Research on material-biosystem interactions	1992-94	NIBH	5,000
	High-order brain function control by plastic nerve circuits	1993-97	NIBH	1,950
	Research on specific solid structures in functional biomaterials	1993-95	NIBH	2,250
	Research on construction of molecular systems	1993-95	NIBH	2,200
	Research on biointerface materials	1993-95	NIBH	1,900
	Analysis of function and dynamic structure of biomolecular aggregates	1991-95	NIBH	794
	Basic research on information processing mechanism of nervous system	1992-96	NIBH	1,100
	Research on methodology for measuring and modeling cognition processes	1993-03	NIBH	2,660
	Research on non-invasive means of elucidating biofunctions	1993-98	NIBH	3,724
	Research on learning to control human behavior and the measurement thereof	1993-99	NIBH	3,724
	Research on basic technologies for elucidating brain functions	1991-95	ETL	2,930
	Research on information transmission mechanism between living organisms	1993-94	ETL	7,361
	Research on use of substances derived from living organisms	1992-95	GIDL, Hok	990

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
(Basic Research from Special Science and Technology Promotion Fund)	Research on transport mechanism in polymer aggregates	1993-95	MEL	Unknown
	Basic research on the environmental effects of solid protein structures	1993	NIBH	Unknown
	Research on use of MRI measurements in human engineering fields	1993	NIBH	Unknown
New Materials (continued)	R&D on vibration-resistant alloys	1989-93	MEL	8,005
	Research on manufacturing process for superlattice materials	1992-96	MEL	13,306
	Research on molecular system with sensing capability	1990-94	NIMC	15,821
	Research on control and utilization of organic/inorganic heterointerfaces	1990-93	NIMC	11,200
	Basic research on synthesis of advanced materials from polynuclear aromatic compounds	1991-94	NIMC	14,000
	Research on synthesis of biodegradable polymers that use carbon monoxide	1991-94	NIMC	9,775
	Research on surface design of sophisticated reaction elements	1992-95	NIMC	31,000
	Research on gate-type photoorganic materials	1993-97	NIMC	9,751
	Research concerned with inventing and applying molecule recognition functions	1993-96	NIMC	28,000
	Research on basic properties and gas synthesis of semi-metallic compounds	1993-96	NIMC	11,200
	Research on control of interface conduction characteristic of composite functional ceramics	1990-94	GIRI, Osa	11,923
	Research on control of optical characteristics of halide glass	1990-93	GIRI, Osa	12,282
	Research on molecular system with a sensing capability	1990-93	GIRI, Osa	12,143
	Research on elements in organic film that display optical functions	1991-94	GIRI, Osa	13,915
	Research on application of new nanocomposites made from intergraphite compounds	1992-94	GIRI, Osa	11,482
	Research on structural control in interpenetrating compounds	1992-94	GIRI, Osa	12,031
	Research on role of dynamic mechanisms in revealing material functions	1993-95	GIRI, Osa	35,295
	Research on ways of evaluating materials by NMR imaging	1989-93	GIRI, Nag	7,128
	Research on particle coating by local hydrolytic reaction	1990-94	GIRI, Nag	8,615
	Research on control of ion exchange characteristic of smectite	1990-93	GIRI, Nag	7,076
	Research on microlamellar materials	1991-95	GIRI, Nag	8,349
	Research on processing composite particles	1992-96	GIRI, Nag	12,250
	Research on slurry molding technique for ceramics	1992-96	GIRI, Nag	14,650
	R&D on fluorine-based optically active liquid crystal material	1992-95	GIRI, Nag	12,314
	R&D on semi-molten molding technology for fire-resistant Mg alloy (research on semi-molten molding of super light-weight active metals)	1993-95	GIRI, Nag	12,979

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
New Materials (continued)	Research on surface control of materials using beam technology	1993-95	GIRI, Nag	12,973
	Research on characterization of ceramic composites by analytic method	1993-95	GIRI, Nag	12,890
	Research on molecular systems with a sensing capability	1990-94	NIBH	10,878
	Basic research on manufacture of new carbon materials by the molecular design method	1991-94	NIRE	15,420
	Research to synthesize phyllosilicates and design basic materials by intercalation	1992-95	NIRE	10,393
	Creation of advanced rare-metal film from microparticles	1993-96	NIRE	24,332
	Research on manufacture of functional composites	1992-94	GIDL, Hok	11,960
	Research on powder method of manufacturing functional superplastic materials	1991-94	GIRI, Kyu	12,180
	R&D on super heat-resistant MoSi ₂ composite ceramic	1991-94	GIRI, Kyu	18,569
	Research on metal/ceramics bonding technology	1993-95	GIRI, Kyu	10,000
	Research on fabrication of semimetallic separation materials in which sugar and sugar-derivatives are used	1993-96	GIRI, Kyu	11,000
	R&D on fire-resistant Mg alloys and development of semimolten molding technology	1993-96	GIRI, Kyu	10,000
	(i) Fire-resistant Mg alloys			
	Research on composite characteristics of whiskers	1991-94	GIRI, Shi	15,816
	Research to evaluate functional characteristics of ADI	1990-94	GIRI, Toh	8,527
	Research to synthesize and find uses for lamellar compounds having a mixed-layer structure	1992-96	GIRI, Toh	10,013
	Research on interfacial structure control of ceramic-metal multilayered film	1992-96	GIRI, Chu	9,761
	Improving accuracy of Charpy impact test	1992-94	NRLM	990
	Research to evaluate mechanical strength characteristic of flexible laminates	1992-94	NRLM	2,240
	Research to evaluate the transfer properties of fine ceramics	1992-94	NRLM	2,120
	Research on dynamics of microregions	1993-95	NRLM	3,250
	Research on superplasticity of single-phase stainless steel	1991-93	MEL	1,020
	Research on improving quality of punched products	1992-94	MEL	620
	Research on technology for identifying functions of inorganic allotropes	1992-96	MEL	5,920
	Research on synthesis of low-order complex organic compounds and electrical/optical properties thereof	1990-96	NIMC	1,700
	Control of molecular characteristics of polymers that act as raw materials of photosynthates	1990-93	NIMC	2,400
	Basic research on production of high-density energy	1990-93	NIMC	2,600
	Basic research on development of inorganic composites used as substitute for hard tissue	1990-93	NIMC	3,500
	Research on synthesis, structure, properties, functions of organic substances with specific structures	1991-95	NIMC	3,400
	Research on CO ₂ separation film	1991-94	NIMC	900

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
New Materials (continued)	Research on electron-transfer reactions in monomolecular film and LB film	1991-93	NIMC	2,700
	Synthesis of electrode catalyst by surface reforming of carbon fiber	1991-93	NIMC	3,200
	Research on forming chemical film by vapor-deposition polymerization method	1991-93	NIMC	700
	Research to analyze and utilize microenvironment of lipid molecule aggregates	1991-93	NIMC	1,600
	Research on selective hydrogenation in which film permeable hydrogen is used	1991-93	NIMC	600
	Research on uses of photocatalyst	1991-93	NIMC	900
	Ion sensitive mechanisms in ion selective electrode using modifier electrode	1992-97	NIMC	950
	Structural research on carbon using vibrational spectral diffraction method	1992-95	NIMC	2,600
	Research on processing of new composite materials	1992-95	NIMC	4,150
	Synthesis of functional inorganic materials by sol gel method	1992-94	NIMC	4,500
	Research on designing catalysts by computer	1992-94	NIMC	3,900
	Molecular design of high-energy substances and dangerous explosive materials	1992-94	NIMC	1,500
	Research to upgrade separation functions through the use of functional material	1992-94	NIMC	3,200
	Research on non-linear function calling structures	1992-94	NIMC	1,700
	Research on breakdown dynamic simulation of composite layered structures	1992-94	NIMC	2,200
	Design and preparation of complex particles	1992-94	NIMC	3,500
	Research on properties of new refrigerants	1992-94	NIMC	800
	Research on composition, properties, and structure of amorphous carbon materials	1993-98	NIMC	1,700
	Research on configuration of molecular aggregates	1993-97	NIMC	3,200
	Research on sequential synthesis of platinum pyrimidine complex and functions thereof	1993-97	NIMC	900
	Research on interrelation of structure and function in organic materials	1993-97	NIMC	3,100
	Surface reforming of metallic compounds by wet method	1993-97	NIMC	2,500
	Laser-assisted formation of composite films	1993-97	NIMC	1,400
	Research on functionally complex electrodes	1993-96	NIMC	800
	Research on design of oriented organic materials	1993-96	NIMC	2,600
	Research on advanced functions in paper	1993-96	NIMC	1,200
	Synthesizing and finding uses for fluorine compounds with low boiling points	1993-95	NIMC	1,850
	Synthesizing and finding uses for polymers containing fluorine	1993-95	NIMC	1,250
	Research on impact chemical synthesis of intermetallic compounds	1993-95	NIMC	1,200
	Research on dynamic interface of non-linear chemical systems	1993-95	NIMC	1,000
	Research on topology of fluorene structures	1993-94	NIMC	2,000

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
New Materials (continued)	Research on characteristics of inorganic chemical systems containing stable free radicals	1993-94	NIMC	1,500
	Intercalation reactions in inorganic materials	1993-94	NIMC	2,000
	Basic research on conductive ceramics	1990-93	GIRI, Osa	2,500
	Research on effects of pressure against glass	1991-94	GIRI, Osa	5,600
	Research on synthesis of monochromatic phosphors	1991-93	GIRI, Osa	2,000
	Using optical stimuli in research to create functional film	1991-93	GIRI, Osa	4,500
	Research on techniques for designing substances and materials from the atomic/electronic level	1991-93	GIRI, Osa	7,500
	Research on advanced composite ceramics using the polymer precursor method	1992-95	GIRI, Osa	3,000
	Catalytic control of carbon fiber/carbon interface	1992-94	GIRI, Osa	3,000
	Observing behavior of glass in heavy gravity environment	1992-94	GIRI, Osa	2,500
	Research on non-oxide glass forming system	1992-94	GIRI, Osa	2,000
	Research on chemical uses of metallic oxides	1992-94	GIRI, Osa	2,500
	Research on ion beam technology applied to design of sophisticated surfaces	1992-94	GIRI, Osa	4,500
	Research to analyze mechanism by which functions are uncovered in liquid electrode interface using the in-situ observation method	1992-93	GIRI, Osa	3,000
	Basic research on environment-friendly catalysts	1993-97	GIRI, Osa	2,500
	Research on material components of solid electrolyte fuel cells	1993-95	GIRI, Osa	2,000
	Research on the effects of fiber-reinforcement on physical properties of composite materials	1993-95	GIRI, Osa	2,500
	Research on ion conductivity of sulfide glass	1993-95	GIRI, Osa	1,700
	Research on long-life organic electrode materials	1993-95	GIRI, Osa	2,000
	Research on improving performance of inorganic composite materials	1989-94	GIRI, Nag	942
	Research on technology for manufacturing ceramics and ceramic composites	1989-93	GIRI, Nag	2,262
	Research on high-melting-point ceramics using a solar furnace	1989-93	GIRI, Nag	1,319
	Basic research on functional titanium base alloy	1989-93	GIRI, Nag	1,131
	Research on ceramics at the crystal phase level	1989-93	GIRI, Nag	1,131
	Research on development and uses of material in different phases	1989-93	GIRI, Nag	1,131
	Research to develop intelligent metallic materials	1990-94	GIRI, Nag	3,593
	Research on interaction between an ion beam and solid surfaces	1990-94	GIRI, Nag	1,696
	Research on environment-resistant functional materials	1990-94	GIRI, Nag	943
	Research to analyze states and reaction processes using magnetic resonance method	1990-94	GIRI, Nag	1,508
	Research on composition and properties of multi-layered composite material	1990-94	GIRI, Nag	754
	Research on molecular transfer in areas where ceramic particles react	1990-93	GIRI, Nag	1,508

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
New Materials (continued)	Research on effects of high-pressure processing on solid phase junctions	1991-95	GIRI, Nag	1,131
	Research on low-temperature and extremely low-temperature physical chemistry	1991-95	GIRI, Nag	754
	Research on functional inorganic materials with high-energy electron beam	1991-95	GIRI, Nag	1,131
	Research on upgrading functions of electronic ceramics	1991-95	GIRI, Nag	2,262
	Research on microstructural control of ceramics	1991-95	GIRI, Nag	3,016
	Research on manufacturing technology for high-performance ceramics	1991-95	GIRI, Nag	1,508
	Research on shaping technology for ceramics	1991-95	GIRI, Nag	6,409
	Research on ultra-high-pressure sintering of super-hard materials	1991-95	GIRI, Nag	754
	Research on environmentally safe catalysts	1991-95	GIRI, Nag	1,462
	Analysis of micropulverization process	1991-94	GIRI, Nag	3,016
	Research on film forming process by ion beam	1991-94	GIRI, Nag	943
	Research on non-destructiveness of metallic materials	1991-94	GIRI, Nag	1,354
	Research on metallic filming method for ceramic powder	1991-93	GIRI, Nag	565
	Research on new method for synthesizing multi-fluorinated organic compounds	1992-95	GIRI, Nag	1,508
	Research on dry processing technology for fine particles	1992-95	GIRI, Nag	1,508
	Research on processing basic materials used in aerospace industry	1992-95	GIRI, Nag	2,262
	Research on method of synthesizing partially fluorinated organic compounds	1992-95	GIRI, Nag	1,885
	Research on compound clusters	1992-95	GIRI, Nag	1,885
	Basic research on energy technologies	1989-93	ETL	3,700
	Basic research on production/processing of particulate materials	1991-94	NIRE	2,380
	Basic research on synthesis and carbonation of carbon precursors	1992-96	NIRE	2,455
	Basic research on CO ₂ trapping and separation materials	1992-95	NIRE	1,460
	Thermoplastic synthesis of new carbon materials	1992-95	NIRE	2,450
	Research to convert hydrotalcite into functional material by intercalation	1993-95	NIRE	1,780
	Research on thermoplastic particle/film formation process	1993-95	NIRE	1,483
	Research on control of high-density particle slurry	1993-96	NIRE	1,300
	Precision control synthesis of rare-earth particles by liquid phase method	1993-96	NIRE	1,700
	Research on controlling material properties	1993-96	GIDL, Hok	2,120
	Research on identifying functions in heavy metal compounds	1993-96	GIDL, Hok	1,060

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
New Materials (continued)	Composition and properties of functional inorganic materials	1991-94	GIDL, Hok	1,590
	Research to assess synthesis of silicon-based functional materials by soft chemistry method	1993-97	GIDL, Hok	1,590
	Research on low-temperature properties of rubber composites	1993-96	GIDL, Hok	530
	Research on processing of inorganic materials	1987-94	GIDL, Hok	1,060
	Research on sintering of boron nitride at atmospheric pressure	1990-93	GIRI, Kyu	2,000
	Research on structural control of carbon materials	1991-94	GIRI, Kyu	2,100
	Research on organizational control of pitch	1991-94	GIRI, Kyu	1,700
	Research on carbonaceous colloids	1991-94	GIRI, Kyu	2,200
	Research on particle electroplating	1991-94	GIRI, Kyu	1,000
	Research on light alloy-based quasi-crystal	1991-93	GIRI, Kyu	2,100
	Research on bioreactors in which carbon-based enzyme carriers are used	1991-93	GIRI, Kyu	2,500
	Research on forming plastic film by sputter method	1991-93	GIRI, Kyu	1,600
	Research on improving characteristics of β -type sintered compacts	1991-93	GIRI, Kyu	2,000
	Research on smectic liquid crystal	1992-94	GIRI, Kyu	1,600
	Research on carbonaceous powder with pitch as raw material	1992-94	GIRI, Kyu	2,000
	Research on improving composite characteristics of B2 intermetallic compounds	1992-94	GIRI, Kyu	1,700
	Research on additional processing of new materials	1992-93	GIRI, Kyu	2,000
	Chemical characteristics of amorphous alloys	1993-96	GIRI, Kyu	1,800
	Research on composition and properties of apatite compounds	1993-96	GIRI, Kyu	1,800
	Research to synthesize hydrated calcium silicate and identify functions thereof	1993-96	GIRI, Kyu	2,800
	Hardening of carbon/ceramic materials	1993-96	GIRI, Kyu	1,800
	Research on carbon/silicide composites	1993-95	GIRI, Kyu	1,800
	Research on internal configuration of artificial film in photosynthetic proteins	1993-95	GIRI, Kyu	2,100
	Research on forming advanced surface layers in areas without heat equilibrium	1991-94	GIRI, Shi	2,250
	Methods for controlling crystal growth	1990-93	GIRI, Shi	1,800
	R&D on particle-dispersed reinforced materials	1992-94	GIRI, Toh	1,690
	Research aimed at developing sophisticated materials by SHS methods	1992-94	GIRI, Toh	4,350
	Research on film fabrication technology	1992-94	GIRI, Toh	1,290
	Research on materials that function at low temperatures	1991-94	GIRI, Chu	2,400

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
(Basic Research from Special Science and Technology Promotion Fund)	Research on non-linear photomolecular devices	1993	NIMC	Unknown
	Research on spontaneous reorienting materials	1993	NIMC	Unknown
	Basic research on fabrication of new materials using thermodynamic data base	1993	NIMC	Unknown
	Basic research on synthesis and functional control of artificial lattices	1993	NIMC	Unknown
	Basic research on enviro-proofing glass surfaces	1993	GIRI, Osa	Unknown
	Research on identifying functions in cluster induced glass	1993	GIRI, Osa	Unknown
	Liquid crystal properties of metallic complexes	1993	GIRI, Osa	Unknown
	Basic research on fabricating composite oxide film	1993	GIRI, Osa	Unknown
	Basic research on functionality of ceramic semiconductor particles	1993	GIRI, Nag	Unknown
	Basic research on functional materials in which biopolymer are used	1993	GIRI, Kyu	Unknown
	Research to optimize longitudinal form of cement-based extrusion-molded materials	1993	GIRI, Kyu	Unknown
	Research on boron-based ceramics	1993	GIRI, Kyu	Unknown
	Basic research on development of hollow fiber-shaped chitin from microorganisms	1993	GIRI, Shi	Unknown
	Research on surface features of deformable metals	1993	GIRI, Toh	Unknown
	Research on two-phase gate distribution phenomenon in reagent impregnated resin systems	1993	GIRI, Toh	Unknown
	Research on surface microstructure of inorganic materials	1993	GIRI, Chu	Unknown
Polymer Engineering (continued)	Research on externally controlled polymer growth process	1990-94	NIMC	11,525
	Research on flocculent structure of liquid-crystal polymers	1990-94	NIMC	10,930
	R&D on organic gradient composites	1990-94	NIMC	11,842
	Research on polymer-metallic cluster composites	1991-95	NIMC	11,081
	Research on function control of polymer materials	1991-95	NIMC	13,851
	Research on interface control of partially compatible polymer materials	1992-96	NIMC	9,759
	Research on precision synthesis and elucidation of structure control polymers	1993-97	NIMC	9,751
	Analysis of functional characteristics of heterogeneous materials	1990-93	NIMC	2,100
	Research on transport and adsorption phenomena of polymer solid/low-molecular systems	1991-95	NIMC	2,700
	Analyzing makeup and characteristics of polyamino acids produced by microorganisms	1991-93	NIMC	2,500
	Research on appearance of high-order structures by interaction of polymer electrolyte and water	1992-95	NIMC	1,700
	Melting and solidifying mechanisms in formation of polymer composites	1992-95	NIMC	1,700
	Photochemical reactions of α , ω -C aryl polyenes	1992-94	NIMC	1,600
	Analysis of bifunctional silicon reagent characteristics	1992-94	NIMC	1,600
	Research on separation film based on molecular engineered design	1993-00	NIMC	1,300

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Polymer Engineering (continued)	Elucidation of hydrophobic monomolecular film surface by measuring intermolecular surface forces	1993-97	NIMC	3,000
	Research on photoreforming of polymer surfaces	1993-96	NIMC	1,600
	Research on rare metal organosol stabilized by surface acting agents	1993-95	NIMC	1,500
	Research on optical/electronic control of organic film	1993-95	NIMC	2,500
	Orientation and high structural control of straight-chained molecular vapor-deposited film	1993-95	NIMC	3,000
	Geometry of multi-body dynamics	1993-95	NIMC	3,000
	Research on phase behavior of polymer mixtures	1993-95	NIMC	1,600
	Research on molecular assemblies	1993-94	NIMC	3,100
	Research on precision measurement and control of vaporized molecules	1993-94	NIMC	2,300
	Synthesis of very low temperature elastomers	1993-94	NIMC	2,000
	Research on chemically cyclic polymers	1993-96	GIRI, Osa	2,000
	Research on effective uses of polymeric materials	1993-95	GIRI, Osa	2,500
	Interrelationship of structure and function in uranium adsorbents	1993-96	GIRI, Chu	3,150
(Basic Research from Special Coordination Fund on S/T)	Research on theoretical construction of polymer materials for design and evaluation purposes	1993	NIMC	Unknown
Reaction and Separation Technologies	Research on creating functional materials and reactive structures for specific reactions	1991-95	NIMC	23,300
	Research on synthesis of functional materials to be used in areas of ultra-high-pressure reactions	1993-96	NIMC	21,000
	Research on designing an organic ultra-fine particle system for reactions	1991-93	GIDL, Hok	10,730
	Research on synthesis of organic functional materials containing nitrogen and sulfur	1990-94	NIMC	1,700
	Photoexcitation radical reactions in microheterogeneous systems	1990-93	NIMC	1,000
	Activating small molecules by constructing areas of surface reactions	1990-93	NIMC	2,700
	Use of heteroelement compounds in precision synthesis	1991-96	NIMC	4,200
	Research on liquid structures in supercritical liquids	1991-95	NIMC	800
	Research on technology for analyzing and assessing materials by luminous radiation	1991-94	NIMC	4,100
	Promoting evaporation of downstream liquid film of viscous bodies	1991-93	NIMC	1,100
	Theoretical research on energetics and dynamics of chemical reactions	1993-97	NIMC	1,400
	Research on basic photochemical processes	1993-97	NIMC	1,600
	Research on specific photochemical reactions	1993-95	NIMC	2,800
	Research on separation functional control by molecular aggregates	1993-95	NIMC	2,200
	Research on reaction and diffusion systems having a hierarchical structure	1993-95	NIMC	1,300
	Enzymatic conversion of lipids with hydroxyl group	1993	NIMC	1,100
	Using solid polymer electrolyte to research catalytic reduction of CO ₂	1991-93	GIRI, Osa	3,000

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Reaction and Separation Technologies (continued)	Photochemical research on intermediate products of halide reactions	1991-93	NIRE	1,950
	Research to upgrade separation and analysis of substances	1990-94	GIDL, Hok	1,410
	Basic research on utilization of metallic complex producing reactions	1990-94	GIRI, Toh	2,020
	Basic research on reaction-separation technology based on supercritical fluids	1990-94	GIRI, Toh	3,800
	Research on technology for continuous ion separation	1990-94	GIRI, Toh	620
(Basic Research from Special Coord. Fund for S/T)	Basic research on development of highly selective chemical reactions	1993	NIMC	Unknown
System Engineering Applications	Research on "intelligent" control processing technology	1989-93	MEL	10,565
	Research on dynamic skills	1991-95	MEL	15,560
	Research on construction of dynamic world model for self-locomotive machinery	1992-95	MEL	13,844
	Research on "whole-arm manipulation"	1992-96	MEL	14,235
	Research on long-arm control by miniature active mass dampers	1989-93	GIRI, Shi	12,297
	Elucidation of fluid interface phenomenon	1993-95	MEL	5,900
	Control technology for mechanical structures	1992-94	MEL	900
	Lateral and longitudinal control of self-locomotive vehicles	1993-95	MEL	2,300
	Research on advanced human interface technology for machine tools	1992-94	MEL	700
	Basic research on coordinated robot control	1992-94	MEL	2,100
	Research on chemical systems used to tackle global warming	1991-93	NIMC	1,200
	Research on support system for measuring and evaluating composite materials	1992-94	NIMC	2,200
	Research on technology for evaluating the internal structure of composite materials	1993-95	NIMC	1,600
	Research on decentralized multi-dimensional data processing system	1991-95	GIRI, Nag	1,508
	Investigative research on strategies for developing energy technologies	1977-94	ETL	1,423
	R&D on new energy systems	1989-93	ETL	3,460
	Research on multi-dimensional environment recognition technology	1990-93	GIRI, Kyu	2,400
	Research on high-speed data acquisition and processing system	1992-93	GIRI, Kyu	1,600
	Research on dynamic control of system having non-linear pendulum	1992-95	GIRI, Shi	1,790
	Basic research on intelligent control mechanisms used in manufacturing systems	1992-96	GIRI, Chu	2,600

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Electronics	Research on innovative configurations for electronic devices	1989-93	ETL	46,100
	Research on electronic characteristics of superstructural materials	1989-94	ETL	28,000
	Research on electronic functions of super molecules	1990-94	ETL	35,600
	Research on basic X-ray laser technology	1990-95	ETL	49,200
	Research on nanostructures	1992-96	ETL	32,500
	Research on fabrication of innovative electronic materials by microscopic interfacial control	1992-97	ETL	49,300
	Research on treating surface layers of materials using a multi-dimensional controlled active beam	1992-97	ETL	36,200
	Research on superconducting electronics	1993-97	ETL	35,600
	Research on measuring rare particles	1987-93	ETL	3,500
	Research on basic light-guided wave technology	1988-93	ETL	6,400
	Research on laser energy applications	1988-94	ETL	6,362
	Basic research on charged beam technology	1988-94	ETL	3,200
	Research on quantum conductivity in quasi two-dimensional systems	1988-94	ETL	800
	Basic research on small SOR devices	1989-93	ETL	2,634
	Basic research on properties of supermolecule	1989-93	ETL	3,174
	Research on electronic properties and new experimental technologies	1989-93	ETL	6,651
	Basic research on nonequilibrium materials	1989-93	ETL	3,092
	Research on design, synthesis, and characteristics of new quantum materials	1989-93	ETL	4,920
	Basic research on functional design and properties of optical materials	1989-93	ETL	4,357
	Basic research on device functions	1989-93	ETL	7,300
	Basic research on semiconductor device configurations	1989-93	ETL	8,450
	Basic research on device processes	1989-93	ETL	5,200
	Research on new superconducting electronic phenomena	1989-93	ETL	3,450
	Research on basic material control techniques	1989-94	ETL	4,217
	Research on high-density energy states using numerical analysis	1989-94	ETL	4,700
	Basic research on radiation properties	1989-95	ETL	5,390
	Research on synchrotron radiation	1990-93	ETL	2,100
	Basic research on innovative substances	1990-93	ETL	3,800
	Basic research on thin-film electronic components	1991-93	ETL	682
	Basic research on superconducting materials	1991-93	ETL	5,904
	Basic research on angstrom properties	1991-93	ETL	4,100
	Research on new microelectronic phenomena	1991-93	ETL	2,400
	Response theory of solid-state electronic systems	1991-93	ETL	3,800
	Research on properties of high-excitation states	1991-93	ETL	7,578
	Research on new basic laser technologies	1991-94	ETL	4,500
	Research on basic remote sensing technologies	1991-95	ETL	1,000
	Research on basic reliability technologies	1991-95	ETL	1,000

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Electronics (continued)	Research on basic high-temperature device technologies	1992-96	ETL	1,500
	Research on quantum effects on microtunneling systems	1993	ETL	4,000
	Research on nanometer circuit printing technology	1993	ETL	6,000
	Research on precision measurement of optical element parameters	1993	ETL	15,000
	Basic research on functional MRI	1993-95	ETL	934
	Scientific analysis of neural data processing mechanism	1993-95	ETL	3,602
	Research on physical properties of superconducting mesoscopic wiring	1993-97	ETL	1,258
	Basic research on supermolecule functions	1993-97	ETL	4,830
Space Development Related Technologies	Research on positioning and attitude technology for use in space activities	1993-97	MEL	9,362
	Research on remote programming using virtual environments	1993-97	MEL	7,345
	Research on a next-generation remote sensing technology	1989-93	GSJ	11,849
	Research on advanced uses of space environment	1993-98	ETL	52,562
	Research on optical sensors for observing the earth	1991-93	NRLM	1,120
	Research on meteorites to understand process by which planets are formed	1991-93	GSJ	511
	Research on next-generation space energy equipment	1992-99	ETL	3,100
	Research on element technologies of thermal power generation system for use in space	1992-93	ETL	3,000
	Photolytic reactions induced by shortwave ultraviolet radiation	1991-94	NIRE	900
	Basic research on ways of analyzing IMG/ADEOS data	1991-94	NIRE	3,240
Information Technologies	Research on flexibly organized data processing system	1988-93	ETL	63,100
	Research on auto-coordination system	1990-95	ETL	41,100
	Research on "intelligent" data processing	1991-96	ETL	47,100
	Research on integrated multi-phase data processing	1992-97	ETL	55,000
	Research on random data processing for mechanical measurements	1992-94	MEL	800
	Elementary research on autonomous robots	1991-93	MEL	1,840
	Research on geological/geographical information	1990-94	GSJ	4,848
	Research on high-precision surveying in which SAR (synthetic-aperture radar) data is used	1993-94	GSJ	1,300
	Basic mathematical research on data processing	1984-93	ETL	3,047
	Basic research on language and programming	1987-93	ETL	4,906
	Research on trends in information science	1988-93	ETL	6,204
	Research to elucidate cognitive process in humans and applications in data processing	1988-97	ETL	4,072
	Research on trends in information sciences	1989-93	ETL	2,400
	Basic research on information base mechanism	1989-94	ETL	4,040
	Basic research on natural language	1989-98	ETL	4,463

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Information Technologies (continued)	Basic research on reasoning	1990-94	ETL	3,847
	Basic research on interactive systems	1990-95	ETL	3,853
	Research on research	1991-93	ETL	2,000
	Basic research on visual recognition	1991-95	ETL	4,736
	Basic research on pattern comprehension mechanisms	1991-96	ETL	4,463
	Basic research on parallel processing systems	1991-96	ETL	5,194
	Basic investigative research on intelligent data processing	1992-94	ETL	2,700
	Basic research on production/perception of sound	1992-95	ETL	4,155
	Basic research on autonomous systems	1992-96	ETL	3,848
	Basic research on computing mechanisms	1992-97	ETL	4,328
	Research on input-output systems in massive parallel processing computers	1993	ETL	15,000
	Basic research on systems technology to assist in the problem-solving process when drafting plans	1993-95	ETL	500
	Research on integrated representation of perceptive media	1993-96	ETL	500
	Basic research on behavioral intelligence	1993-02	ETL	5,328
	Research on image processing	1993-97	GIDL, Hok	530
Industrial Base Technologies	Research on micromachines (evaluating mechanical characteristics of silicon micromachine elements)	1990-94	NRLM	11,766
	Research on hydrodynamic characteristics of turbopumps for artificial hearts	1993-97	MEL	9,257
	Research on electromagnetically floated fixed staging system	1991-95	MEL	14,630
	Research on technology for manufacturing thin boards from advanced metallic materials	1991-95	MEL	9,619
	Research into virtual air-conditioning technology	1991-95	MEL	17,122
	Research on high-efficiency propulsion technology for passenger ships	1992-94	MEL	10,825
	Research on laser-based fabrication of carbon composite clusters	1989-93	NIRE	8,302
	Research on form separation of solid particles	1990-93	NIRE	7,964
	Research on particle surface reforming technology which makes use of centrifugal flow areas	1992-95	GIDL, Hok	8,283
	Research on surface evaluation by fractoemission and applications thereof	1990-94	GIRI, Chu	13,152
	Research on advanced numerical analysis methods	1993-95	MEL	4,000
	Transfer characteristics of mechanical elements	1991-93	MEL	3,860
	Research on mechanical element mechanisms in fluids under different phases	1993-95	MEL	1,470
	Research on damage to rolling surfaces	1991-93	MEL	1,500
	Research on measurement of impact sounds	1991-93	MEL	820
	Active noise control of 3-D vibrational noise radiation	1992-94	MEL	1,248
	Research on non-steel friction materials	1992-93	MEL	800
	Basic research on worker-friendly machines	1991-93	MEL	2,100
	Control of electric discharges by lasers in underwater work	1992-94	MEL	4,070

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Industrial Base Technologies (continued)	Research to develop vibration- and shock-resistant sensors	1992-94	MEL	820
	Research on shape-remembering feature of high-oriented polymer materials and assessing the dynamic characteristics thereof	1992-94	MEL	4,860
	Research to upgrade the function of materials formed by super high isotropic pressure	1993-95	MEL	1,140
	Development of fully-enclosed die forging technology and a quieting technology for forge pressure machines	1992-94	MEL	1,940
	Research on very advanced tribology system	1993-95	MEL	3,720
	Basic research on microgrinding mechanism for crustaceous materials	1991-93	MEL	1,300
	Research on high-quality grinding processes for new composite materials	1992-94	MEL	1,800
	Thermochemical machining of ceramics having no conductive properties	1991-93	MEL	650
	Upgrade of joining and reforming technology	1992-94	MEL	3,650
	Research to upgrade high-precision cutting and micromachining methods	1992-94	MEL	1,720
	Character recession of machine tool joints	1992-94	MEL	1,030
	Basic research on ways to express manufacturing knowhow	1993-95	MEL	2,050
	Thermal sound effects and cryogenic applications	1993-95	MEL	2,900
	Research on dynamic characteristics of magnetic flux lattices in new superconducting materials	1993-95	MEL	1,300
	Research on limiting excited complex production	1992-94	MEL	2,400
	Research on the control of intermolecular hydrogen transfer reactions	1993-94	MEL	2,500
	Research on reactions in which nitrous oxide gas is formed	1992-94	MEL	1,800
	Research on small carbon clusters	1992-94	MEL	5,940
	Research on recycling of organic resources	1992-94	MEL	1,100
	Basic research on numerical analysis of turbulence	1993-95	GIRI, Osa	3,000
	Research on closed-cycle MHD power generation system	1989-93	GIRI, Nag	954
	Research on characteristics of aqueous solutions having low freezing points	1990-94	GIRI, Nag	1,685
	Research on easy and quick way of measuring particle concentration in exhaust gas	1989-93	ETL	6,407
	Research on model-free robotics	1992-93	ETL	6,500
	Research on concept design system with advice-giving feature	1989-93	ETL	9,213
	Research to upgrade pattern recognition based non-linear optical data processing	1992-97	ETL	11,529
	Research on injection molding methods for new untreated powders	1990-94	ETL	5,055
	Research on solidifying characteristics of various metals cast by vanishing film method	1991-93	NIRE	900
	Basic research on environmental energy systems	1991-93	NIRE	1,400

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Industrial Base Technologies (continued)	Research on high-efficiency thermal energy direct conversion elements based on macro- and meso-structural control	1991-94	NIRE	3,050
	Investigative research on new energy conversion technologies	1992-94	NIRE	1,472
	Applied research on superconductivity phenomenon	1993-97	GIDL, Hok	2,650
	Research on mixed-phase flow process	1993-97	GIDL, Hok	3,710
	Research on manufacture and application of separation materials	1992-94	GIDL, Hok	1,410
	Research on synthesizing useful organic compounds	1992-96	GIDL, Hok	2,910
	Research on heat pumps	1993-95	CIDL, Hok	1,060
	Basic research on photofunctional materials	1990-93	GIRI, Kyu	2,000
	Research on makeup of zeolite	1990-94	GIRI, Kyu	1,600
	Research on functionality of ceramics	1991-93	GIRI, Kyu	2,100
	Basic research on uses of porous SiC	1992-93	GIRI, Kyu	1,600
	Research on manufacture of slow release particles	1992-95	GIRI, Kyu	2,100
	Research on use of tube drawing process to give specific characteristics	1992-95	GIRI, Kyu	2,000
	Research on powder injection molding	1992-94	GIRI, Kyu	2,000
	Research on high-density metazoa incubation and organic wastewater treatment	1993-96	GIRI, Kyu	1,700
	Research to evaluate characteristics of powder paste	1993-96	GIRI, Kyu	1,700
	Research on system for molding multicurved surfaces by "intelligent" control of flexible rolls	1993-96	GIRI, Kyu	2,100
	Research on extrusion process for SiC ^W /Al composites	1993-94	GIRI, Kyu	1,700
	Research on technique for directly measuring thermal properties of molten states	1993-95	GIRI, Toh	1,940
	Research on porosity of metal surfaces	1993-94	GIRI, Toh	760
	Research on technology for molding processed surfaces	1992-95	GIRI, Chu	1,700
	Research on energy systems	1992-94	GIRI, Chu	1,200
	Chemiluminescent analysis of biologically essential ocean elements	1993-97	GIRI, Chu	800
	Research on microstructural and acoustical properties of advanced materials	1993-95	GIRI, Chu	5,000
(Basic Research from Special Coord. Fund for S/T)	Basic research on tribological control of mechanical elements by electroviscous fluids	1993	MFI	Unknown
	Research on catalytic uses of antimony compounds	1993	GIRI, Osa	Unknown
Frontier Research	Research on advanced next-generation production systems	1991-93	MFI, NRI, MFI	15,027
	Research on structural control and method of evaluating amorphous polymer materials	1991-93	NIMC	17,696
	Research on high-temp fiber-reinforced ceramics	1991-93	GIRI, Osa	16,989
	Design and fabrication of innovative biocatalyst based on quantum biochemical analysis	1992-94	GIRI, Nag, GIRI, Kyu, NIBH	9,982

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Basic International Research	Research on cluster science	1992-97	NAIR	98,988
	Research on bionic designs	1992-97	NAIR	98,952
	Basic research on self-organization of atomic groups	1992-97	NAIR	28,546
	Basic research on process by which clusters are formed	1992-97	NAIR	13,322
	Basic research on developing biomimetic material elements	1992-97	NAIR	9,515
(Basic Research from Special Coord Fund for S/T)	Basic research on method of evaluating static and dynamic structures at the atomic level	1993	NAIR	Unknown
	Research on cluster formation process	1993	NAIR	Unknown
	Basic research on rebuilding living tissue	1993	NAIR	Unknown
Specific International Joint Research Projects	Research on temperature measurement in the very high-temperature ranges	1993-95	NRLM	10,847
	Research on holographic interferometer for precise measurement of shape	1991-94	MEL	11,280
	Research on the generation and utilization of high-energy density plasma	1990-93	NIMC	7,767
	Research on revealing catalytic functions by aberrant valency control	1991-94	NIMC	7,767
	Research on developing sophisticated crystal by ion beam	1993-95	GIRI, Osa	8,231
	Research on mechanisms by which methane is emitted into the atmosphere	1990-93	NIBH, GSJ	17,295
	Basic research on biosensors	1993-95	GSJ	7,767
	Research on long-range operation of remote-controlled robots	1993-95	ETL	8,317
	Research on production, transportation, and alteration of acid rain	1990-93	NIRE, GIRI, Nag	17,295
	Research on process by which matter is recycled and transported in the north and south hemispheres and development of models thereof	1993-95	NIRE	10,496
	Research on mining safety technologies	1991-94	NIRE	14,587
	Research on mining safety technologies	1991-94	NIRE	14,587
Mine Safety	Research on mining safety technologies	1991-94	NIRE	14,587
	Research to construct strong quality design system	1992-94	NRI M	7,360
	Research on advanced welding system for dissimilar materials	1991-93	MEL	6,575
	Research on pressurized joints in new materials	1991-93	GIRI, Nag	6,192
	Research on new processing technology for limiting elation of lead in dynamics	1993-95	GIRI, Nag	6,502
	Development of replacement materials for tortoise shell by integrating natural polymers	1992-94	NIBH	5,945
	Research on technology for manufacturing aluminum plated whisker-reinforced alloy	1992-94	GIRI, Shi	5,507
	Research on replacement materials for tortoise shell by integrating natural polymers derived from insects	1992-94	GIRI, Shi	5,999
	Research on high-efficient means of manufacturing superhard resistant materials	1992-94	GIRI, Chu	6,743
Small- to Medium-Size Companies	Development of high-performance X-ray spectral and fluorescence for use atomic energy development	1989-94	NRI M	17,276
	Development of high-performance X-ray spectral and fluorescence for use atomic energy development	1989-94	NRI M	17,276

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Small- to Medium-Size Companies (continued)	Research on technology for evaluating heat property data of nuclear materials	1993-97	NRLM	17,441
	Non-contact remote monitoring system to monitor structural elements in nuclear power plants	1993-97	MEL	15,046
	Research to create advanced materials for collecting gaseous radioactive compounds	1989-93	NIMC	9,834
	Research to elucidate and investigate the degradation of polymer materials in a nuclear environment	1989-93	NIMC	10,258
	Research on excreting method for in vivo contamination caused by radioactive nuclide	1990-94	NIMC	18,007
	Natural analog research on leaching behavior of glassified blocks	1989-93	GIRI, Osa	12,153
	(costs required to prevent radioactive injury)	—	GIRI, Osa	734
	Research on radiation damage to organic materials under simulated nuclear fusion reactor conditions	1992-96	GIRI, Nag	13,115
	(costs required to prevent radiation damage)	—	GIRI, Nag	5,906
	(costs required to maintain and operate specific equipment)	—	GIRI, Nag	8,000
	Research on phenomenon of nuclide migration within base rock with respect to deep underground disposal of high-level radioactive waste	1990-94	GSI	29,526
	Research on upgrading methods of evaluating earthquake resistance in discontinuous base rock surfaces in both the foundation and inclined planes around nuclear power plants	1991-95	GSI	17,699
	Research on nuclear fusion reactions	1975-96	ETL	202,330
	Research to evaluate adaptability of data storage and processing systems in autonomous-type plants	1989-93	ETL	16,933
	Research on oscillation of free-electron lasers	1989-93	ETL	52,404
	Research on superconducting magnet with high magnetic pulse	1989-95	ETL	29,875
	Research on methods of evaluating radiation effects and developing standards thereof	1989-98	ETL	64,736
	Research on developing a high-performance radiation detection system and the applications thereof	1991-95	ETL	14,973
	Research on KrF excimer laser drivers used in nuclear fusion	1991-97	ETL	88,906
	Research on basic technologies for heat- and radiation-resistant semiconductor elements	1993-97	ETL	25,302
	Research on actual activity plan for robots used in nuclear power plant environments	1993-97	ETL	20,453
	Research to upgrade and find uses for new quantum radiation sources	1993-97	ETL	36,723
	Research on variable-wavelength coherent X-ray light source technology	1993-97	ETL	21,998
	(cost required to prevent radiation damage)	—	—	3,651
	(cost required to maintain and operate specific equipment)	—	—	78,712
	Research on base rock dynamic of underground radioactive waste treatment spaces	1989-95	NIRE	18,057
	Research on new methods of separating cesium by redox-type ion exchanger	1993-97	GIRI, Kyu	8,875
	Research on development of adsorbents for separation/extraction of light element isotopes	1993-97	GIRI, Shi	15,656

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Peaceful Atomic Energy Uses (continued)	Research on technology for manufacturing buffer material used in deep underground disposal of high-level radioactive waste	1993-98	GIRI, Toh	13,197
	Detailed evaluation of effects radiation has on the environment	1990-94	GIRI, Nag	943
	Theoretical research on plasma containment and transport phenomena	1978-93	FTI	1,000
	Research on maintenance, improvement, and application of radiation standards	1979-95	ETI	6,060
	Research on energy equilibrium of pinch plasma	1980-93	ETI	4,400
	Research on technology for generating high-quality particles (photons) and the uses thereof	1981-95	ETI	3,160
	Research on pulse power technology	1990-94	ETI	1,000
	Research on relaxation phenomena in high-beta plasma	1991-95	ETI	1,140
	Research on structural control of inorganic ion exchangers	1992-95	GIRI, Toh	2,340
Pollution Prevention	Research on commercializing diesel exhaust particle removal system with filter trap and catalytic converter system	1990-93	MEI	13,466
	Basic research on air purification methods for closed spaces such as tunnels	1991-95	MEI	19,948
	Research on ways to reduce tire noises	1992-94	MEI	32,038
	Research on purifying diesel engine exhaust gas by mid-to-late stage combustion	1992-95	MEI	18,864
	Research on reducing diesel engine pollution by low-cetane combustion	1993-96	MEI	16,166
	Research on technology for predicting environment-related standards for purposes of preassessing the environmental impact of chemical substances	1990-93	NIMC	12,956
	Research on advanced methods of treating effluent containing toxic waste from high-tech industries	1990-93	NIMC	20,313
	Research on upgrading treatment of organic wastewater	1991-95	NIMC	15,434
	R&D on special biological treatment process for rubber and plastic waste	1991-95	NIMC	7,270
	Research on combined catalytic system for reducing diesel NO _x	1991-95	NIMC	14,744
	Research on treatment of toxic chemical gases	1991-94	NIMC	11,144
	Research on alternative organic tin antibiotic-bonded polymer	1991-94	NIMC	16,073
	Research on sophisticated gas sensors for monitoring the environment	1992-96	NIMC	18,736
	Research on technologies for dealing with land based pollution caused by toxic organic compounds	1992-95	NIMC	15,928
	Research on decomposition of hard-to-decompose toxic organic chemicals by catalytic oxidation	1990-94	GIRI, Osa	19,262
	Research on combined catalytic system for reducing diesel NO _x	1991-95	GIRI, Osa	9,289
	Development of special biological treatment process for rubber and plastic waste	1991-94	GIRI, Osa	10,061
	Research on technology for dealing with inland water pollution caused by toxic organic compounds	1992-95	GIRI, Osa	12,046

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Pollution Prevention (continued)	Development of special biological treatment process for rubber and plastic waste	1991-95	NIBH	19,197
	Development of highly sophisticated system for removing and recovering phosphorous	1992-94	NIBH	17,016
	Research on psychological and physiological methods for evaluating fluctuating odors	1990-93	NIBH	16,130
	Research on methods for purifying polluted bottom sediment in lakes and marshes	1990-94	GSJ	24,639
	Research on psychological and physiological methods for evaluating fluctuating odors	1990-93	ETL	23,136
	Research on denitration and deoxidation by electric discharge method	1992-96	ETL	23,143
	Structure of coastal areas and clean-up methods	1990-93	NIRE	16,064
	Research on non-polluting methods of treating and making use of asbestos wastes	1990-93	NIRE	17,909
	Research on treating high-tech industrial waste	1990-93	NIRE	13,412
	Research on mechanism by which low-frequency percussive sounds are produced and propagated and the means of measuring those sounds	1990-93	NIRE; NIBH	23,327
	Research on decomposition of hard-to-decompose toxic organic chemicals by catalytic oxidation	1990-94	NIRE	16,437
	Research on simultaneous reduction of N_2O and NO_x emissions from coal-fired equipment	1991-94	NIRE	21,552
	Research on the nitrogen cycle with respect to interior bay area sediment	1991-94	NIRE	19,581
	Research on NO_x reducing catalytic system	1991-95	NIRE	13,279
	Research on breakup of toxic chemicals along coasts	1992-94	NIRE	31,510
	Limiting toxic chemical output of dust collectors	1992-94	NIRE	28,485
	Research on ways of dealing with contamination of inland water by toxic organic compounds	1992-95	NIRE	10,690
	Research on achieving sensitive analysis of waste-related organic substances by hybrid methods	1992-95	NIRE	11,994
	Research on highly selective separation technology for preventing emission of toxic organic compounds	1992-96	NIRE	22,782
	Non-toxic denitrification of bioorganic industrial waste	1993-95	NIRE	23,040
	Research on high-efficiency catalytic combustion and NO_x reduction in small combustors	1993-96	NIRE	18,970
	Research on technology for limiting production of toxic substances in incinerating industrial wastes	1993-96	NIRE	22,446
	Research to develop automated method for measuring the properties of source emitted particles	1993-96	NIRE	22,737
	Research to develop technology in which photocatalysts are used to eliminate atmospheric pollutants	1993-97	NIRE	18,384
	Research on process by which internal industrial products circulate through the coastal ecosystem and a technology for measuring the environmental impact thereof	1993-97	NIRE	30,757
	Research on treating industrial wastes from high-tech industries	1990-93	GIDL, Hok	15,281
	Research on simultaneous reduction of N_2O and NO_x from coal burning devices	1991-94	GIDL, Hok	16,470
	Research on circulating organic toxic compounds by chemical reduction method	1991-95	GIDL, Hok	11,156

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Pollution Prevention (continued)	Research to develop technologies for removing chlorine from plastic waste	1992-95	GIDL, Hok	17,557
	Research on technology for analyzing microecosystems with respect to the solidification and clean-up of oil spills at sea using microorganisms	1993-97	GIRI, Shi; NIBH	32,562
	Research involving wide-ranging environmental study of geological changes in Inland Sea of Japan and appropriate environmental control methods thereof	1990-94	GIRI, Chu	90,937
	Research on process by which internal industrial products circulate through the coastal ecosystem and a technology for measuring the environmental impact thereof	1992-95	GIRI, Chu	21,388
	Research on process by which internal industrial products circulate through the coastal ecosystem and a technology for measuring the environmental impact thereof	1993-97	GIRI, Chu	31,600
	Separation and decomposition of toxic chemicals	1991-93	NIMC	2,200
	Research on adsorption in aqueous solutions	1992-96	GIRI, Nag	600
	Research to upgrade technologies that pertain to measuring environmental factors	1989-93	NIRE	1,131
	Research on matter circulation in N. Pacific Ocean	1990-93	NIRE	2,640
	Research on functional catalytic support	1990-93	NIRE	1,650
	Research on advanced separation method for analyzing and/or treating toxic chemicals	1990-93	NIRE	4,340
	Basic research on optical characteristics of source emitted patterns	1991-93	NIRE	2,000
	Basic research on water-based microecosystems located at the bottom of the carbon cycle	1991-93	NIRE	3,450
	Characteristics of film separation reactor	1991-93	NIRE	1,000
	Research on recovering useful products from sugar-related pollutants	1991-93	NIRE	1,100
	Research on recovering H ₂ gas from organic wastes	1991-93	NIRE	700
	Research on effects of pre-ozone oxidation on active carbon adsorption	1991-93	NIRE	800
	Research on process by which atmospheric pollutants are incorporated into clouds	1991-93	NIRE	4,656
	Basic research on heat-balancing mechanism between land and water	1991-93	NIRE	568
	Research on solid electrolyte fuel cell with the aim of treating environmental pollutants	1991-94	NIRE	1,200
	Research on microbiological conditions in desert areas	1991-94	NIRE	568
	Research on decomposition of natural organic substances in intertidal zones	1991-94	NIRE	935
	Research to evaluate effects of heterogeneous reactions on fate of chemical substances	1992-94	NIRE	500
	Research on sorption/adsorption treatment of nitrogen	1992-94	NIRE	800
	Basic research on use of catalysts for environmental cleanup purposes	1992-95	NIRE	1,971
	Research on gas activation of carbon fiber	1992-95	NIRE	1,059
	Basic research on controlling adsorption by microwaves	1992-95	NIRE	1,000

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
Pollution Prevention (continued)	Research on ways of evaluating the effects of organic solvent-based VOC air pollutants	1992-95	NIRE	900
	Research on eliminating toxic chemical pollutants through the use of enzymes	1992-95	NIRE	2,038
	Research on microscopic analysis of HIB metals by SIMS	1993-95	NIRE	600
	Research on heat transfer and reactions in pressure fluidized bed combustion	1993-95	NIRE	1,800
	Research on method of measuring ΣCO_2 in interior bay areas by electrode method	1993-95	NIRE	1,504
	Research on method of measuring the microenvironment of the sediment surface layer	1993-96	NIRE	468
	Basic research on structure of coastal ecosystem	1992-95	GIRI, Chu	1,500
	Research to ascertain the effects of high sea levels in the Inland Sea of Japan	1992-94	GIRI, Chu	2,500
(Basic Research from Special Coord. Fund for S/T)	Basic research on mechanism by which infrasonic waves propagate through the atmosphere	1993	NIRE	Unknown
	Basic research on method of analyzing mixed microorganism groups by means of agnetic probe	1993	NIRE	Unknown
International Industrial Technologies	Research on preventing gas and coal dust ignition in mines	1990-93	NIRE	2,290
	Research on developing simple means of treating highly concentrated organic effluent	1991-93	NIBH	1,510
	Research on exploration/development of underground resources in Mongolia	1991-94	GSJ	3,963
	Research on lignocellulose polyurethane	1991-94	NIMC	4,343
	Research on surface processing and reforming technologies	1992-94	MEI	1,685
	Research on development of advanced polymer composites	1992-94	NIMC	3,982
	Research on coal field and coal formation characteristics	1992-94	GSJ	5,008
	Research on weather resistance of polymer materials in low latitude areas	1993-96	NIMC	4,940
	Research on design and manufacture of high-quality casted products	1993-95	GIRI, Nag	1,768
	Research on characteristics of water environments in arid and semi-arid parts of Chinese continent	1993-96	GSJ	5,164
	Research on multi-functional system that uses temperature differences in atoll regions of the oceans to produce energy	1993-96	GSJ	2,986
	Research on effective uses of unused tropical biomass	1993-96	NIRE	5,989
	Research on technology for preventing pollution caused by powerful adsorbents	1993-93	GIID, Hok	5,819
(Technical Transfer Research)	Research on heat property measurements and standard references for solid materials	1991-93	NRI M	4,013
	Research on raw materials for chemical industry from natural oils	1992-94	NIMC	1,599
	Research on technology for calibrating radiation thermometers in the mid-to-high temperature range	1993-95	NRI M	7,469

3. Individual Research Projects Listed by Subject (Continued)

Area of Research	Research Project	Term	AIST Lab	Amount Budgeted
(Developmental Research)	Research on developing advanced types of paper	1991-93	NIMC	1,878
	Research on exploring the mineral resources of ocean plate fragments	1992-95	GSJ	3,979
	Research on chemical pollution in Kuwait and Egypt	1993-95	NIRE	1,909
	Research on method of greening using functional soil restoration agents	1990-93	NIMC	1,228
	Research on technology for preventing widespread pollution in the tropical rain forests that often accompanies mining developments	1990-93	NIRE	3,569
	Research on technology for preventing acid rain caused by coal combustion	1991-93	GIDL, Hok	1,692
	Research on water purification by simple activated charcoal	1992-94	GIRI, Osa	6,731
	Research on methods of predicting air pollution as it pertains to industrial sites	1992-94	NIRE	3,424
	Research on treating wastes from leather industry	1993-95	NIMC	4,199
	Research on assessing the environmental impact of industrial wastes on tropical coastlines	1993-96	GIRI, Chu	3,383
	Research on high-performance metallic composites	1993-97	MEL	25,996
	Preventing acid rain caused by coal combustion	1991-93	NIRE	3,631
	Research on method of greening using functional soil restoration materials	1990-93	GIDL, Hok	1,814
Cooperative Research Programs	Research on machine translation system to handle translation between neighboring countries	1987-94	ETI	12,034
	Collaborative research on recovering usable resources from brackish water	—	GIRI, Shi	
	Collaborative research on preserving and continuing to make use of biological diversity	1993-98	NIBH	1,776

Key: GIRI, Osa: Govt. Industrial Research Institute, Osaka; NIBH: Natl. Inst. of Bioscience and Human Technology; GIRI, Nag: Govt. Industrial Research Institute, Nagoya; GSJ: Geological Survey of Japan; GIDL, Hok: Govt. Industrial Development Lab, Hokkaido; ETI: Electrotechnical Laboratory; GIRI, Kyu: Govt. Industrial Research Laboratory, Kyushu; NIRE: Natl. Institute for Resources and Environment; GIRI, Shi: Govt. Industrial Research Laboratory, Shikoku; NAIR: Natl. Inst. for Adv. Interdisciplinary Research; GIRI, Toh: Govt. Industrial Research Laboratory, Tohoku; NRLM: Natl. Research Laboratory of Metrology; GIRI, Chu: Govt. Industrial Research Laboratory, Chugoku; MEL: Mechanical Engineering Laboratory; NIMC: Natl. Institute of Materials and Chemical Research.

International R&D Cooperation

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[Text]

1. Institute for Transfer of Industrial Technology (ITIT)

The Institute for Transfer Industrial Technology Program (ITIT Program) is a series of programs involving AIST laboratories that is designed to promote cooperative international research in the mining and manufacturing industries which have received numerous requests from developing countries for technical assistance. The program is also designed to contribute to the economic growth of those countries (est. 1973). The aim is to assist developing countries in determining research projects and improving their research capability which involves sending researchers from Japan or accepting researchers from developing countries for the purpose of assisting those countries in establishing their own research base.

2. Specific Programs

(1) Cooperative International Research Program

This is a joint research program that is conducted between AIST research laboratories and research institutes in developing countries.

1—Special Research

These are joint research projects that are carried out between an AIST laboratory and an overseas research institute in which the research topic matches the field of research represented by an AIST laboratory and, at the same time, responds to the social needs of the developing country.

2—Transfer Research

It is often very difficult for technologies that have been developed in Japan to take root elsewhere even when a technology has been transplanted in fact to another country. Therefore, in order to promote effective technology transfers and have a particular technology take root, this type of research is designed to facilitate the technology transfer process by determining such things as whether improvements or further work is required of a given technology.

3—Developmental Research

In order to try to make more effective use of the industrial products produced by a developing country, this research program provides the future seeds for both special and transfer research by conducting a systematic analysis on the makeup of a country's industrial base, and examining the possibilities of expanding that base.

(2) Overseas Research Program To Investigate Technologies

This program involves conducting on-site surveys in order to identify areas of research and future cooperative research topics that are needed in developing countries.

(3) Mobile Researcher Programs

1—Trainee Acceptance Program

This program is designed to introduce and train technical specialists from developing countries at AIST research laboratories at the request of the Japan International Cooperation Agency.

2—Mobile Researcher Program (costs covered by Cooperative Research Program)

The following five programs have been assigned to the New Energy Development Organization which will try to beef up and strengthen the programs.

a. Fellow Researcher Invitation Program

This program is designed to promote effective research cooperation by inviting researchers from fellow research institutes to take part in joint research.

b. Specific Investigative Research Program

In this program, a comprehensive survey is done of the needs of industry in a given developing country and surrounding countries so that the research of the program contributes to effective economic growth of the developing country.

c. Research Management Invitation Program

This program will try to promote more effective research cooperation with developing countries by deepening mutual understanding and involves inviting six research managers to Japan and providing them with the opportunity to discuss the current status of research laboratories, research implementation, and R&D.

d. Special Researcher Invitation Program

This program is designed to elevate the research level of developing countries by inviting up to seven researchers from developing countries who have produced extraordinary achievements in R&D-related fields to take part in long-term joint research important to those countries.

e. International Symposium Program

This program will invite up to 12 researchers from developing countries, as well as researchers from advanced countries who share the same problems as developing countries, to attend an international symposium to exchange opinions in the form of lectures presented at the symposium on the status of research and problem areas in their respective countries.

(4) International Joint Research Cooperation Program

This program concerns research problems that cannot be dealt with merely by AIST laboratories in response to requests from developing countries. This program aims to make effective use of the R&D potential of certain advanced countries to conduct joint research with developing countries on topics that have been mutually agreed

upon by a government research institute in an advanced country and an AIST laboratory

(5) Global Environmental Technologies Program

In this program, AIST research laboratories conduct joint R&D with research institutes of developing countries in order to solve environmental problems on a global scale such as desertification, destruction of forests, and acid rain.

(6) Specific Key Research Cooperation Projects

In response to requests made by developing countries for advanced technical research cooperation, this program involves the use of advanced laboratories (experimental equipment) in joint research conducted between AIST research labs and overseas research institutes. In 1993, research cooperation will be extended to supporting industries in developing countries which have shown a certain urgency in terms of achieving economic independence.

FY93 Research Projects of International Research Cooperation Program

(1) Special Research

Research	AIST Lab	Overseas Lab	Term
1 Research to tackle the problem of gas and coal dust ignition in mines	NIRE	China: Bantan Scientific Research Institute	1990-93
2 Research to develop simple treatment methods for highly concentrated organic effluent	NIBH	Thailand: Asia University of Engineering	1991-93
3 Research on exploration and development of underground resources in Mongolia	GSI	Mongolia: National Geological Center, Geological Resources Research Institute	1991-94
4 Research on lignocellulose polysurethane	NIMC	Costa Rica: National Timberlands	1991-94
5 Research on surface processing and reforming technologies	MII	South Korea: Industrial Technology Research Institute, Mechanical Research Lab	1992-95
6 Research on development of advanced polymer composites	NIMC	China: National Industrial Technology Research Institute	1992-94
7 Research on coal field and coal property characteristics	GSI	Indonesia: Coal Gas Technology R&D Center; Malaysia: Geological Survey Institute	1992-94
8 Research on weather resistance of polymer materials in low latitude areas	NIMC	Indonesia: Science Institute, Applied Physics R&D Center	1993-96
9 Research on methods of designing and manufacturing high quality, low cost products	GRI Nag	Malaysia: Industrial Standards Research Lab, Polymer Technology Center	1993-95
10 Research on characteristics of moist environments in good and semi-arid parts of Chinese continent	GSI	China: Geology and Mining Dept., Geological Museum Research Lab	1993-96
11 Research on multifunctional system that uses temperature differences in air to generate energy	ITI	Fin: South Pacific University	1993-96
12 Research on effective uses of unused tropical biomass	NIRE	Indonesia: Agency of Forestry Development, Cellulose Research Lab	1993-96
13 Research on preventing pollution through use of advanced adsorbents	GRI Hok	Thailand: Science and Technology Research Institute	1993-96

(2) Transfer Research

Research	AIST Lab	Overseas Lab	Term
1 Research on standard substances and means of measuring heat properties of solid materials	NRLM	South Korea: National Industrial Technology Research Institute, Scientific Standards Research Lab	1991-93
2 Research on raw materials for chemical industry biomineralizations	NIMC	Malaysia: Palm Oil Research Lab	1991-93
3 Research on calibrating radiation thermometers in mid to high temperature range	NRLM	Indonesia: Scientific Research Institute, Metrology R&D Center	1993-95

(3) Developmental Research

Research	AIST Lab	Overseas Lab	Term
1 Research to develop paper with advanced features	NIMC	[not relevant]	1991-93

Research Projects Profiled

(1) Special Research

Research to tackle problem of gas and coal dust ignition in mines (1990-93) (NIRE)

Most of the energy needs in the People's Republic of China are supplied in the form of coal. At slightly less than 11 metric tons, China boasts the world's largest annual output of coal. In recent years, most of the drilling for coal has been done in mines, and in view of the fact that work conditions have deteriorated as drilling has reached deeper levels, and the fact that there has been an upsurge in both the percentage of accidents and number of major mine disasters, government-related organizations have shown great concern over these matters and have given high priority to promoting R&D on mine safety and security.

This project is meant to tackle the more serious accidents that are caused by the ignition of gas and coal dust in the mines, and look into the mechanism by which ignition is caused by metal sparks in mines and look for ways to prevent this from occurring based on studies with coal mine explosives.

This is the final year of this research project, so an effort will be made to put together a comprehensive study that includes the ignition characteristics of coal mined in China, the characteristics of gas and coal dust ignition caused by sparks produced in the collision of metals or by the heat generated by mechanical friction, and the characteristics of gas and coal dust ignition that is caused by abnormal blasting, all of which have been items carried out so far by experimental research.

Research to develop process for simple treatment of highly concentrated organic effluent (1991-93) (NIBH)

Effluent treatment has become a serious problem in Southeast Asian countries which are undergoing rapid industrialization.

However, it is almost impossible to introduce much of the effluent treatment equipment developed in Japan to these countries because the running costs are quite high and a great deal of expertise is needed for maintenance and upkeep of the equipment.

That being the case, this research will try to perfect a simple treatment method for highly concentrated effluent that is suitable for Southeast Asian countries by introducing techniques such as microorganism immobilization in a low-cost treatment of methane gas and by developing an "easy-to-maintain" method of treatment.

Research on exploration and development of underground resources in Mongolia (1991-94) (GISJ)

This is a basic research project carried out in cooperation with a research partner in Mongolia that is designed to promote a more modern and efficient means of

exploring and developing the rich mineral and energy resources deposited in the mountainous plateaus of Mongolia.

This research will be divided into the following two segments according to objective and means:

(1) Research on mineral resource distribution and means of exploration

This segment will involve research on the interrelationship between magma activity and those base metals such as copper, lead, and zinc, as well as rare metals such as tungsten, tin, molybdenum, niobium, tantalum, and rare earth, and bring to light the distribution of those resources and appropriate methods of exploration.

(2) Research on coal and oil shells

This segment will have to do with geological research on the rich Mongolian coal beds and accompanying oil shells.

Research on lignocellulose polyurethane (1991-94) (NIMC)

In the coffee and sugar cane producing countries, such as Costa Rica and those located in the tropical and subtropical areas of the world, there are now no effective uses for the large quantities of secondary products such as coffee bean shells or bagasse produced from these products. More often than not these products are either used as fuel or left to stand alone. If coffee bean shells and bagasse were, however, to be converted to polyurethane by an appropriate means, quite valuable uses might be found for these products in buffers, heat insulation materials, and paints. That being the case, this research project will attempt to convert the secondary products described above that are produced in Costa Rica to a raw polyurethane material and try to find effective uses as a resource material for various industries.

Research so far has examined the constituent makeup of coffee bean shells and bagasse and examined these in solution form. A chemical and thermal analysis has also been done of lignocellulose solutions.

The research to be done in 1993 will involve a study on the process of making polyurethane from Costa Rican coffee bean shells and bagasse in solution, and a chemical analysis of the polyurethane obtained.

Research on surface processing and reforming technology (1992-93) (MIT)

As industrial technologies have become more internationalized, it is important that R&D be conducted jointly with other countries including South Korea, one of the industrial powers of Asia, as it pertains to developing machining and other core industrial technologies and upgrading other technologies having to do with surface reforming, wear resistance, and lubrication. This project will be carried out jointly with the Industrial Technology Research Institute of Korea (KAITECH).

and the Korean Institute of Machinery (KIMM) and will seek to upgrade cutting technology and improve the methods used to reform mechanical elements and wear-resistant surfaces, and along with that try to perfect a standard, recognized method of evaluating the performance of those technologies.

The details of the project will include developing a sensor signaling process for detecting machining states, which has been lacking in advanced cutting work and a control technology for optimum machining condition and tool locus, doing a study to optimize surface reforming involving plasma, etc., and perfecting a method of evaluating surface reforming film from a tribological perspective. In 1993, research will involve prototyping a tool with a sensor function that will be used to measure temperature characteristics and frequency response properties. Further research will include evaluating the tribological characteristics of surface reforming film in various types of gas atmospheres.

Research on development of advanced polymer composites (1992-94) (NIMC)

With the remarkable progress that various industries have made in South Korea, we believe that one of the next areas of importance will be advanced polymer composites. That would lead to the need to perfect a composite technology that would include a method of molding and evaluating the performance of composites, and to establish a base with respect to its commercialization. Meanwhile, consideration has to be given to the fact that thermoplastic resin composites are attracting a lot of attention because they are more easily recycled than conventional thermohardened resin composites. To deal with this, joint research will be conducted to develop an advanced fiber-reinforced thermoplastic composite and an advanced polymer alloy, and to try to upgrade composite technology and establish a base for commercialization.

Research so far has looked into the development and commercialization of a fiber array control and molding method, and investigated the interrelationship between the morphology of polymer alloys and impact resistance.

What will be done next is to study methods of arranging fiber reinforcement with the aim of improving impact resistance and, along with that, evaluating the method of molding composites and the dynamic characteristics of the material. A study will also be done on the interrelationship between the compatibility and morphology of the polymer alloy and between compatibility and dynamic characteristics.

Research on coal field and coal property characteristics (1992-94) (JSL)

This is a research project that will contribute to the exploration and development of coal fields in Southeast Asia by shedding some light on the history of how sediment basins were formed in the coal fields of Sumatra,

East Kalimantan, and Sarawak in Indonesia, and by elucidating the coal properties of each of those coal fields.

The project also involves the transfer of some Japanese technology to Indonesia concerning the analysis of sediment basins and the evaluation of coal properties. It also takes up the development of new technologies for evaluating coal properties and heat formation.

The research has been divided into two areas:

(1) Research on analyzing sediment basins

This will involve using techniques such as computer simulation and relative sediment analysis based on existing geographical data to shed light on the formation of the sediment basins.

(2) Research on coal properties

This will involve doing various types of analyses including a technical analysis on specimens of coal taken from actual sites in order to understand coal properties, and will also involve developing new technologies on the use of CO-MS in analyzing coal properties. The various data collected on coal properties will provide a better understanding of the formation of coal fields.

Research on weather resistance of polymer materials in low latitude areas (1992-96) (NIMC)

We are seeing more and more products being manufactured around the world in which polymer materials are being used in the making of that product, but the specifications of that material are best suited to mid-latitude areas, and very little data has been collected on material characteristics for low-latitude areas where the temperature and humidity are high and the sunlight is intense. Polymer materials do not hold up very well in low latitude areas, so it has become somewhat of an urgent matter to find materials having good durability and to perfect a technology for evaluating weather resistance, which would give some insight into material design. In this research, researchers will try to perfect a means of evaluating the weather resistance of poly-propylene, which is one of the main polymers being produced in Indonesia, giving special consideration to the high temperature and humidity found in low latitude areas.

The research this year will include measuring the radiation of the sun in the ultraviolet, visible, and infrared regions, and using a standard test piece for measuring energy (JIS K 7200), identifying those factors which cause the breakdown of material in low latitudes by collecting data aftering the weather resistance of polymer materials. The research will also submit poly-propylene test pieces in Indonesia and Japan to exposure and compare the breakdown behavior of each.

Research on methods of detecting and manufacturing high quality bonded products (1993-95) (JRL, Sarc)

This research project is intended to promote the growth of both the mining and foundry industries in Malaysia

which play a role in supplying the essential goods and materials needed to improve the standard of living in Malaysia (machine parts and consumer goods). This will be a joint research project conducted with the Standards and Industrial Research Institute of Malaysia (SIRIM) and the Foundry Group (FG) and will involve research on effective uses of local raw materials and on foundry technologies that meet local product requirements.

The project will first include a local fact-finding survey and research on material design and systems in order to develop a foundry technology that is compatible with local materials, products, and the economic environment. The research then looks into the melting process inside an actual foundry for the purpose of trying to eliminate possible defects and improve product quality. Research will also be done on a molding process suited to product shape and material used.

The research this year will include a survey of locally produced raw materials such as palm oil and silica, which is obtained as a byproduct when mining tin, and also survey the market needs and supply status of locally made founded products. The results will then be used to develop a software package for analyzing material designs of founded products by personal computer. Further research will be done to commercialize the material design technology into a local manufacturing system for founded goods.

Research on characteristics of moist environments in arid and semi-arid parts of the Chinese continent (1993-1996) (GSJ)

In this project, research will be done to elucidate the characteristics of moist environments in dry desert areas. A particular effort will be made to gain a true understanding of the mechanism by which underground water flows and forms in areas populated by multiple rivers. Based on this research, the goal of the project is to help formulate policies for developing and preserving effective water resources in arid areas.

The research will mainly focus on the Gobi Desert in the autonomous southern region of Inner Mongolia in inland China where a local joint research survey will be conducted regarding the geology and moisture of the region and calculations will be made based on remote sensing devices as to the different lithologies and levels of moisture in the soil.

This research concerning inland rivers will measure the flow rate and water quality changes through time for several rivers and then collect data on the origin and distribution of the underground water. In conjunction with this, a geological survey will be taken of river basins to determine the location of former rivers within the desert that were covered over by sand. The area is quite wide and difficult to access, so research will also be conducted using remote sensing data (JERS-1).

Research on multifunctional system that uses temperature differences in atoll regions of oceans to produce energy (1993-96) (ETL)

This is a research project in which researchers from both countries will jointly study the relationship between the living and social conditions in the unique atoll regions of the oceans which include the island of Fiji and the products that are produced from a multifunctional energy utilization system based on the temperature differential of the ocean (electric power, fresh water, heat and coldness, fishery products, and seaweeds). With the goal as perfecting a means of designing and evaluating such a system adapted to the atoll region, the following research will be conducted in order to elucidate the effects that a multifunctional energy utilization system, making use of the low-temperature and eutrophic properties and purity of deep-sea water, has on the living and social environment of Fiji based on actual on-site atoll conditions.

(1) Data will be collected in Fiji on social conditions related to the unique products and natural environment of the atoll region.

(2) Researchers from Fiji will be invited to Japan to deepen their knowledge of said technologies through hands-on research using a scaled down version of an ocean temperature differential power generation system, and ascertain what the system characteristics are for conditions on Fiji.

(3) Working jointly, the two research organizations will do a systematic study in order to refine the image of the multifunctional energy utilization system.

Research on effective uses of unused tropical biomass (1993-96) (NIRE)

In the tropical parts of Indonesia, there is an abundance of fast growing trees such as the eucalyptus as well as a poorly underused herbaceous biomass. There is also an enormous amount of agricultural wastes found in tropical regions, organic wastes from agricultural and forestry processing industries such as rice straw, bagasse, palm oil wastes, pulp wastes, and wood scraps and so forth that are left behind from the plywood industry. Most of these organic wastes are just discarded without being recycled and become a source of pollution.

Biomass, however, being a recyclable organic resource, has a major role to play in preserving the global environment by fixing CO₂ gas and preventing destruction of the CO₂ gas balance in the atmosphere. The aim of this research will be to examine the potential of biomass in the laboratory in terms of oil technology and to try to come up with new and more effective uses for biomass in which the rich supply of unused tropical biomass and agricultural wastes can be used as resources for manufacturing high value-added liquid fuel or as raw materials for the chemical industry.

The research this year will be to conduct a survey in Indonesia on the variety and availability of unused tropical trees and herbaceous biomass as well as agricultural wastes and organic wastes from the agricultural and forestry processing industries. Research will also examine the chemical composition, properties, and thermodynamic characteristics of each form of biomass and then study the suitability of each as liquid fuel or as raw material for chemicals.

Research on preventing pollution through use of sophisticated adsorbents (1993-96) (GIRI, Hok)

Developing effective uses for peat and lignite, which are deposited under the earth in large quantities in Thailand, has become an issue of national importance. Moreover, in Thailand, it is urgent that something be done about the spread of pollution in the air and water caused by the rapid industrialization of the country.

The aim of this research will be to develop a means of preventing pollution using sophisticated adsorbents based on joint IIT research conducted from 1990 to 1992 on an active treatment technology for peat and lignite coal.

The work to be done this year will take place in Thailand and will involve holding discussions on research particulars, concluding a research agreement, conducting on-site surveys, and acquiring raw materials. Following that, researchers will investigate ways of improving performance and developing optimal adsorbent conditions based on a detailed characterization of the raw materials, and then will determine whether they can be used as resource materials in preventing pollution by testing gas adsorptivity and water treatment capability.

(2) Transfer Research

Research on standard substances and means of measuring heat properties of solid materials (1991-93) (NRLM)

South Korean industries are rapidly growing, and the raw material and energy industries, in particular, are in immediate need of a way of evaluating the thermal properties of materials, so the leadership of national research institutes in South Korea is demanding that a highly accurate means be developed for measuring heat properties. That being the case, this research will push to standardize and commercialize the laser flash method and other high-precision heat property measurement methods owned by the National Research Laboratory of Metrology and then transfer those technologies to the National Research Institute of Korea and the National Scientific Standards Research Institute of Korea. At the same time, research will verify the technology transfer by developing standard heat property substances as well as measure the heat properties of various materials needed for the growth of Korea's main industries.

In research this year, scientists will select standard substances from graphitic, glassy carbon and ceramics, which are candidate materials for standard thermal

diffusivity substances based on results of high-temperature stability tests, and measure the thermal diffusivity of those materials. Researchers will then compare those measurements with the values obtained at the National Research Lab of Metrology for thermal diffusivity measurements of standard substances by equipment perfected for that purpose, and then verify that the technology transfer for the laser flash method of measuring thermal diffusivity has been completed.

Research on raw materials for chemical industry from natural oils (1991-93) (NIMC)

The aim of this research is to develop a technology for converting high-grade fatty acids, which are easily obtained from natural oils and secondary products, to high value-added industrial raw materials by means of hydrogenation and other types of reactions. The palm oil of Malaysia, which is a product of the tropical rain forest, is harvested six times a year, and contains a higher content of oil than any other type of oil-producing plant. Thus, one of the main features of palm oil is its stable supply as a raw material for the chemical industry. In this research, scientists will perform hydrogenolysis using a ruthenium-based catalyst based on a new sol gel method developed at this laboratory, and will try to convert the main components of palm oil, oleic acid and lauric acid, to a high-grade alcohol under mild conditions by conventional methods. In order to commercialize this research, however, the manufacturing cost of the catalysts must be reduced and the plant designs must be resolved based on high-pressure gas.

The work to be done this year in terms of commercializing this research will be to develop a low-cost catalyst to replace the rare metal ruthenium catalyst, and to conduct two studies on the design of a pilot plant, one on identifying potential problems and the other on economic calculations.

Research on calibrating radiation thermometers in the mid to-high temperature range (1993-95) (NRLM)

A survey conducted as part of the IIT research cooperation program found that there was a need to develop a domestic technology for measuring high temperatures and thermal radiation in the steel industry of Indonesia.

The Indonesian Scientific Research Institute and R&D Center of Metrology employ four fixed temperature points as temperature standards and provide calibration services for thermocouples and high-temperature photothermometers, but they have a short history as far as research on measuring radiation temperature is concerned, and not much progress has been made either in equipment calibration.

Accordingly, there is need to perfect a means of measuring and calibrating temperatures in new radiation thermometers, and to do this, Japan's cooperation in research is essential.

That being the case, this research will include transferring a technology for calibrating radiation thermometers in the mid-to-high temperature range, perfecting a system for setting, maintaining, and managing high-temperature standards in Malaysia and maintaining a measurement control system, improving calibration technology in the mid-to-high temperature range while trying to upgrade industrial standards, and developing a commercial calibration system.

The research this year will attempt to develop the ideas for a high-temperature standards system having the requisite precision and to draw up a plan for a calibration system.

(3) Developmental Research

Research to develop paper with advanced features (1991-93) (NIMC)

This project will attempt to make use of pulp and active carbon which can be manufactured from scarcely used resources, such as agricultural wastes and peat found in abundant quantities in developing countries in Asia, Africa, and South and Central America as raw materials, in developing a paper having sophisticated features such as the ability to maintain freshness, be non-odorous, and be non-fading. This project will use the findings of this

research to promote the growth of the packaging- and construction-related industries in those developing countries.

The research done so far includes a study of how active carbon is made from raw materials such as the fine dust attached to the fiber of the coconut shell, bagasse, and peat, and the conditions under which paper is made with active carbon. A test was also done on the adsorptive separation of ethylene, CO₂ gas, and amine gas by active carbon and paper containing active carbon.

The research this year will be to continue studying methods of chemically treating paper containing active carbon, zeolite powder, or a mixture of those powders for the purpose of further improving the characteristics of the paper for adsorptive separation of ethylene and amine gas which are significant factors in terms of maintaining freshness and being odor-free. In specific terms, scientists will use the reaction of ethylene in a halogen acid and acid solution to chemically treat an active carbon and zeolite powder, and an active carbon and zeolite paper with those chemicals and develop a powder and paper having high ethylene adsorptivity. Researchers will also conduct a study on chemical treatment methods with the aim of further improving the adsorptive separation properties of the that powder and active carbon paper with respect to CO₂ gas, amine gas, and sour gas.

1993 Research Projects from International Joint Research Cooperation Program

Research	AIST Lab	Oversens Lab	Term
1. Research to explore mineral resources of ocean plate fragments	GSJ	Great Britain: University of London Geological Survey Institute; Indonesia: National Tectonic Engineering R&D Center	1992-95
2. Research on chemical pollutants in Kuwait and Egypt		U.S.: Environmental Protection Agency, Environmental Research Institute; Kuwait: Kuwait National Research Institute; Egypt: Mansura University	1993-95

Research to explore the mineral resources of ocean plate fragments (1992-95) (GSJ)

The aim of this research project will be to develop a technology for exploring mineral resources, such as rare metals that are concentrated in ultrabasic rocks in the ocean plate of Indonesia, and to improve the joint research capability of Indonesia by working jointly with them to merge the structural analysis technology developed by the University of London with the mineral deposit exploration technology developed by the Geological Survey of Japan.

The research this year will concentrate on a study of the petrographic properties and geological age of the ultrabasic rocks and basalt, and on shedding some light on the distribution of lineaments and faults.

Research on chemical pollutants in Kuwait and Egypt (1993-95) (NIMC)

In Kuwait, there is a great deal of concern over the effects that pollution is having on the soil, groundwater, and coastline areas due to the encroachment of crude oil

from oil drilling and the effects of the Persian Gulf War, and the same concern is also present in the delta region of the Nile River in Egypt over the pollution caused by the use of large amounts of agricultural chemicals. In those areas, it is necessary to study the environment and living organisms to get some idea of the degree of pollution, assess the danger for people to pollution, and then develop appropriate strategies to deal with those situations.

Japan has a long history of investigating environmental pollution, and the United States has enormous research capabilities to show the dangers of pollution. That being the case, the aim of this research project will be to survey the surface water, bottom sedimentation, groundwater, soil, and living organisms in both Kuwait and Egypt with respect to pollution caused by oil derivatives and chlorine compounds and to forecast the direction that pollution is taking in the future, along with evaluating the danger to human health, and to help both countries come up with some chemical means of dealing with those problems.

The research to be done this year in Kuwait will include joint research with the Kuwait Scientific Research Institute and will involve taking samples of the soil in the oil field areas and samples of the groundwater below the soil and ascertaining the degree of pollution caused by oil-related substances. The research in Egypt will be conducted jointly with Mansura University and will involve taking samples of the water, bottom sediment, fish, and

other organic life from Lake Manzara at the mouth of the Nile River to get an idea of the actual status of organic chlorine-based chemical pollutants. Research will also be conducted jointly with the U.S. Environmental Protection Agency's Environmental Research Institute to do a study on what basic data is needed to evaluate the danger that chemical environmental pollution poses to human health.

1993 Research Projects from Global Environmental Research Cooperation Program

Research	AIST Lab	Overseas Lab	Term
1. Research on methods of greening using functional soil restoration agents	NIMC, GIRI, Hok	India: Central Arid Zone Research Institute; Philippines: Industrial Development Research Institute	1990-93
2. Research on means of preventing widespread pollution in tropical rain forests brought on by mining development	NIRE	Brazil: Bureau of Mining	1990-93
3. Research on means of preventing acid rain caused by burning of coal	NIRE, GIRI, Hok	China: Baitan Scientific Research Institute, Tohoku Institute of Engineering	1991-93
4. Research on water purification using simple activated charcoal	GIRI, Osa	Philippines: Forest Product Research Lab	1992-94
5. Research on ways of predicting air pollution as it pertains to industrial sites	NIRE	India: India University of Science, India University of Engineering	1992-94
6. Research on treatment of wastes and recovery of resources in leather industry	NIMC	China: Sinkiang Industrial Design Research Institute	1993-95
7. Research on assessing the environmental impact of industrial wastes on tropical coastlines	GIRI, Chu	Brazil: Sao Paulo University, Sao Paulo Environmental Improvement Research Institute	1993-96

Research on methods of greening using functional soil restoration agent (1990-93) (NIMC, GIRI, Hok)

In southern Asian countries which have had rapid population growth, there is a noticeable increase in the level of deforestation and desertification due to human encroachment. The aim of this research will be to help preserve the global environment by restoring conditions in those areas so that the barren soil will grow plant life again, and to develop, in joint research with the Central Arid Zone Research Institute of India, an arid wasteland restoration agent having a water retention capability, a fertilizer retention capability, and be biocompatible.

The research this year will be to elucidate the retention and migration behavior of moisture and phosphates with respect to treating the barren soil with a restoration agent developed the year before to demonstrate the effectiveness of arid wasteland soil restoration agents. Further research will be done to elucidate the decomposition and dissolution of clay minerals and hydrophilic organic matter in order to study the stability of the arid wasteland soil restoration agent in the environment. (NIMC)

Making the earth green once again in areas that have been turned to desert by indiscriminate deforestation of tropical rain forests and expansion of farmlands is one of the important areas of work to preserve the global environment.

This will be a four-year research project conducted jointly with the Philippines, a country undergoing deforestation, whose main aim will be to develop a greening

technology using a functional microcapsule that contains essential substances having soil regenerative properties.

The research this year will be done in Japan and will be to test manufacture the microcapsule by the spray-coating method and then to perform dissolution tests. The research done outside Japan will include a study of the manufacturing process as adapted to the Philippines based on research findings, and a microcapsule dissolution test on local soil. (GIRI, Hok)

Research on means of preventing widespread pollution in tropical forests that are brought on by mining developments (1990-93) (NIRE)

Due to the unique environment of the tropical forests, there are no technologies available at present to prevent pollution, brought on by mining developments, from taking place. For that reason, the ecosystem of plants and other living creatures in the tropical forests, which is necessary to maintaining the global environment, is in the process of being destroyed. In Brazil, companies employ a gold smelting method and mercury amalgam method. There is a great deal of concern in Brazil over the large quantities of mercury being used and the effects that the poor management of mercury have on the surrounding environment. For that reason, an appropriate solution must be found very quickly to prevent this type of pollution from spreading.

The aim of this project will be to develop a method of surveying local conditions based on previous surveys conducted on pollution by parties inside and outside the

country, and to conduct a local survey on the Brazilian Amazon River region. The next step will be to conduct a joint analysis of that data and to try to find ways to prevent pollution. Research will also include as one of the pollution prevention measures a study on how to create a non-polluting smelting process.

The research this year will focus on studying local survey data on the effects mercury pollution has on the Tapajos River basin that branches off the Brazil-to-Paraguay Amazon River and analyze the results taken from that survey. Research will also include a study on the possibility of commercializing an alternative non-polluting smelting process.

Research on means of preventing acid rain caused by burning of coal (1991-93) (NIRE, GIRI, Hok)

Acid rain is becoming a serious problem in countries such as China. The main cause of acid rain is SO_x and NO_x , which is produced by the burning of coal. With the expected increased use of coal in the future, it has become a matter of urgency that a technology be developed to prevent the production of those types of atmospheric pollutants.

That being the case, the purpose of this research will be to develop a method adapted to conditions in China that will remove the smoke emitted from the burning of coal, develop a clean preprocessing treatment for coal, and find a way of reducing SO_x and NO_x by switching to circulating fluidized bed combustion.

Specifically, researchers will try to keep production of the main culprits of acid rain, SO_x and NO_x , to a minimum by using a typical type of Chinese coal, which researchers studied last year, and by following through on the research described below.

(1) Research on clean preprocessing treatment of coal

(a) Research in Japan

This research will involve trying to perfect a clean preprocessing treatment for coal by removing the inorganic sulfur by oil agglomeration of the carbon containing organic sulfur, the carbon containing inorganic sulfur, and the high ash content carbon, and by removing heteroelements of organic sulfur by treatment in a mild reducing atmosphere and hot water treatments.

(b) Research done outside Japan

This research will attempt to optimize the preprocessing treatment by conducting combustion tests on clean-burning coal to elucidate the optimum conditions for combustion.

(2) Research on reduction of SO_x/NO_x by circulating fluidized bed combustion

(a) Research in Japan

This research will attempt to perfect a method for across-the-board reduction of SO_x and NO_x by trying to find an

optimum desulfurization and low NO_x combustion method in circulating fluidized bed combustion of high-calorie Chinese coal.

(b) Research done outside Japan

This research will involve a study to find the optimum desulfurization and low NO_x combustion method with respect to low-calorie Chinese coal with high sulfur content in order to elucidate the optimum conditions for combustion in a circulating fluidized bed boiler.

Research on water purification using simplified activated charcoal (1992-94) (GIRI, Osa)

The degradation of water quality in Southeast Asian countries, such as the Philippines, due to indiscriminate deforestation, generally unregulated discharge of effluent, and the discharge of untreated industrial effluent is becoming a source of great concern. Accordingly, Japan has been asked to provide the technical support in developing and building a simple and inexpensive water purification system for the Philippines that would be used to guard against the pollution described above and to provide a safe high-quality and intermediate-quality water supply. That being the case, researchers have started work developing and building a charcoal-based water purification system of the kind that has been popular in Japan.

More specifically, this research will attempt to perfect effective uses for simplified activated charcoal (sophisticated charcoal with activated carbon features) with the aim of protecting the water supply in the Philippines. Researchers will strive to develop a simple and inexpensive water purification system that uses activated charcoal to improve the quality of river water, waste water, and industrial effluent. Along with that, researchers will also try to find more effective uses for unused timber resources in the Philippines and improve the local technologies for global environmental preservation.

Specific Research

Researchers will try to develop a manufacturing process for simplified activated charcoal by trying catalytic carbonization of various types of wood and investigating the relationship between the internal structure and function (decomposition of organic matter, and adsorption/desorption of heavy metals) of the simplified activated charcoal obtained. Meanwhile, research will also be done in the Philippines to assess the features of carbon as simplified activated charcoal by performing carbonization tests on locally obtained wood and using data obtained in Japan.

Research on ways of predicting air pollution as it pertains to industrial sites (1992-94) (NIRE)

There is some concern over the possible global effects of industrial activities taking place due to the industrialization of South Asian countries such as India. Moreover, the noticeable lack of any pollution prevention policies

and the degree of air pollution caused by toxic industrial emissions makes it incumbent that a quick solution be found. This research will attempt to develop ways of predicting air pollution for the specific meteorological conditions of India and Southern Asia based on methods developed earlier in Japan for preventing atmospheric pollution brought on by industrial pollution. Moreover, it is essential that this method of predicting air pollution be able to deal with various meteorological conditions and emission sources so that it can be used for other developing countries.

Researchers will investigate the behavior and sources of acidic air contaminants in southern Asia such as sulfur dioxide gas and nitrous oxide. As part of that research, scientists will perform a diffusion test using local emission sources to elucidate the characteristics of air pollution in southern Asia, and using that data develop a method of predicting air pollution.

In 1993, researchers will continue the diffusion experiment from the previous year using local emission sources in an attempt to gather more data, and along with that will investigate the relationship between parameters and meteorological conditions in an atmospheric diffusion model for the dry season of India by elucidating the accumulated meteorological data from the diffusion tests done in the previous year.

Research on treatment of waste and recovery of resources in leather industry (1993-95) (NIMC)

Raising cattle is the main business in Sinkiang Province in China, thus the leather industry plays a very important role in that area. In recent years, however, China has complained of serious environmental problems, and one of the most serious problems is finding a way to treat the effluent from the leather industry. The effluent from the leather industry contains chrome, surface acting agents, lipids, proteins, and calcium salts, and cannot be purified simply by biological means. For that reason, the Sinkiang Industrial Design Research Institute has asked the National Institute for Materials and Chemicals to participate in joint research for the purpose of introducing a new waste water treatment technology.

The most difficult problem to deal with in the effluent being discharged by the leather industry is the chromium ions. Chromium ions are by no means the only toxic substances contained in the waste water, but they themselves are almost impossible to treat biologically when present in effluent. The aim of this project will be to study methods of treating the surface acting agents, oil

components, and sulfur, which are the other toxic materials contained in the effluent, with the idea of removing the chromium ions in the effluent. In order to remove chromium ions, there is a question of cost that must be answered with regard to the precipitation treatment based on pH regulation, but it will be almost impossible to remove all the chromium ions, particularly when there are proteins in the effluent. The research in this project will primarily concern the adsorptive removal of chromium ions by a low-cost inorganic ion exchanger.

The research this year will include the adsorptive removal of chromium ions by titanium oxide and synthetic materials in particular and perfecting a way of synthesizing an optimum titanium oxide. Researchers will also conduct the same research on silicon oxide and make a comparison between commercial and synthetic products. A study will also be done on precipitation treatments in order to elucidate the problem areas in precipitation of actual effluent and to try to improve that method.

Research on assessing the environmental impact of industrial wastes on tropical coastlines (1993-93) (GIRI, Chu)

As industry has grown in Brazil, the quality of water along the coastlines of the country has been seriously affected by the increase in industrial effluent. The aim of this research will be to elucidate the marine structures that are characteristic of tropical coastlines from a physical, chemical, and biological perspective, and then show the effects that industrial effluent have on water quality. By doing that, researchers will try to perfect a method of evaluating the effects that industrial effluent have on water quality along tropical coastlines, thereby contributing to healthy industrial growth while maintaining good environmental conditions.

In Japan, a highly accurate method of evaluating the effects that industrial effluent have on the coastlines of temperate Japan has already been developed, but that method is not appropriate for the shoreline areas of Brazil. That being the case, researchers will try to ascertain what types of chemical substances and biological life exist within the currents and ocean waters considered part of the tropical coastline of Brazil, and then determine what modifications have to be made to the method developed in Japan for measuring biological effects so that it can be used for the coastline environment of Brazil. Additional research will include a study on ways of making improvements to the coastline environment in Brazil.

The research this year will focus on elucidating the water quality and current characteristics along the Brazilian coast.

1993 Specific Key Research Cooperation Program

Research	AIST Lab	Overseas Lab	Term
1. Research on sophisticated metal-based composites	MEL	Singapore: South Sea Engineering School	1993-97

Research on highly functional metal-based composites (1993-77) (MEL)

The industrial fields that deal with automotive mechanical elements and precision parts for electrical and electronic machinery are making a lot of progress in developing highly sophisticated metal-based composites that are used to make things lighter.

Singapore is a country trying to develop many of its own industries and has a growing need for composite materials.

The aim of this project will be to jointly develop a technology for manufacturing highly sophisticated metal-based composites and a technology for molding complex composite forms and microforms.

The research this year will include using a powder metallurgical method to design a metal-based composite exhibiting high relative strength and stiffness.

Using extrusion molding, HIP molding, and solidification molding processes such as impact molding, researchers will try to identify what the optimum conditions are for

molding metal-based composites of high relative strength and stiffness. Researchers will also study heat treatment conditions in which metal-based composite of high relative stiffness exhibit superplasticity.

Using a powdered metal injection molding method that molds metal-based composite into complex forms and microforms, scientists will then do moldings tests to study the solidification molding process and molding conditions for a matrix made of metal-based composites.

Using the same method, scientists will then perform molding tests to study the solidification molding process and molding conditions for an abrasion-resistant metal-based composite.

(25) Research Cooperation Project Promotion Program

This is a program that is basically designed to solve many of the basic problems shared by developing countries, which include the economic and social problems that developing countries face, by marshalling together the expertise of the national research laboratories in Japan with that of academic institutes and industrial research labs for the purpose of implementing comprehensive joint research with developing countries from the basic to the applied levels of research.

1993 Research Cooperation Program Research Projects

Research	AIST Lab	Overseas Lab	Term
1. Research on machine translation system to handle translation between neighboring countries [machine translation]	ETL, International Center for Information Cooperation	China: Nanken Technology Center; Thailand: NECTEC; Malaysia: Malaysia School of Engineering; Indonesia: University of Indonesia	1987-94
2. Research on technologies for recovering valuable resources from brackish water [brackish water]	GIRI, Shikoku, New Energy & Industrial Technology Development Organization	China: China Institute of Science, Marine Research Institute; Mexico: Bureau of Mines and Resources	1989-94
3. Collaborative research on sustaining and preserving biological diversity [biological diversity]	NIBH, New Energy & Industrial Technology Development Organization	Thailand: Science and Technology Research Institute, Biotechnology and Genetic Engineering Research Lab, et al.; Indonesia: Bandung University of Engineering, Bogoul University of Engineering	1993-98

Research on machine translation system to handle translation between neighboring countries (ETL)

Objective

One of the major impediments in the way of transferring technologies from Japan to neighboring countries is the almost impossible task of mastering the Japanese language. That being the case, the aim of this project will be to develop a machine translation system to facilitate technical and cultural exchange between Japan and its neighboring countries and effectively transfer computer technologies.

Particulars

This will be a national research project and involve the use of the world's first intermediate language system as a means of translating multiple languages. This system will be designed to handle Japanese, Chinese, Thai, Malaysian, and Indonesian. Using an intermediate language, it

will analyze what has been said and translate this from the intermediate language to any of the languages mentioned above.

The work to be done in 1993 will be to make language descriptions more specific in terms of operative concepts. The research will try to expand and improve basic concepts, do a detailed analysis of the relationship with objects based on expanded usages and try to make the concepts even more specific. Researchers will also try to make the look-up system on usages even more specific, and design the system for general use. The project will also include a performance evaluation of the environment in which the prototype machine translation system is being developed as well as an evaluation of the intermediate stage system.

The research with other participating countries will involve continuing the cooperative research on an intermediate language by transferring researchers back and

forth between countries, improving operative concepts in the intermediate language, and doing evaluations on each of the languages.

Research on technologies for recovering valuable resources from brackish water (GIRI, Shikoku)

The aim of this research cooperation project will be to assist Mexico and China in developing natural resources by conducting R&D on a comprehensive system for systematically recovering valuable resources such as lithium, barium, bromine, and boron that can be found in the brackish salt manufacturing waters along the coast of Mexico and in the brackish natural gas waters and salt lakes of China.

Objective

Research the following items in 1993.

(1) Research done in Japan

Do a study of column adsorption and desorption methods using an anionic adsorbent

Do a study of high-purity methods of separating and refining lithium as an element technology of lithium adsorptive extraction system.

(2) Research done outside Japan

Do a local survey on the factors needed to make an economic assessment of a recovery system for valuable resources

Collaborative research on sustaining and preserving biological diversity (NIBH)

Objective

A great variety of living plants and animals inhabit the tropical areas of the earth, but those areas have been losing a major portion of their biological diversity in recent years due to tropical forests being cut down. The genetic resources found in the biological life forms of tropical areas is considered extremely important in the field of biotechnology. The aim of this project will be to conduct collaborative research on a technology for segregating, breeding, and preserving microorganisms and on ways to evaluate useful functions in order to enable the developing countries themselves to gather, preserve, and sustain the bioresources of those tropical areas.

Particulars

Researchers will survey the current status of research in those countries on the diversity of biological life in tropical areas, and will discuss the specifics of research collaboration. Moreover, in Japan, researchers will try to segregate, breed, and assess the characteristics of useful microorganisms using specimens of microorganisms taken from tropical areas.

Miscellaneous AIST R&D Plans

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[Text]

1992 Research Projects Funded by the Special Coordination Fund for Promotion of Science and Technology

I. General Research

1. Basic and leading-edge science and technology research projects

(1) Substances and materials

(new research)

- International joint research on developing a model for predicting the characteristics of advanced materials
- Basic research on producing materials in a short time frame using a microgravity environment
- Basic research on creating intelligent materials through manipulation of atoms and molecules

(ongoing research)

- Research to develop technologies for generating, measuring, and utilizing extremely high vacuums
- Research to develop technologies for generating and utilizing vacuum ultraviolet light
- Basic research on ways to use host/guest reactions to create new functional materials
- Basic research on material interconnections by forming ideal surfaces
- Research on basic technologies concerned with non-destructive methods of quantitatively and intelligently evaluating materials and structures with high reliability

(second phase research)

- Research on the measurement, evaluation, and control of element functions in substances and materials at microscopic level
- Research on building data bases for R&D on super-conductive materials

(2) Life Sciences

(new research)

- Research to develop ways to externally reveal abnormalities in brain functions
- Research to develop basic technologies for the purpose of elucidating bionanostructures

(ongoing research)

- Research to develop basic technologies for elucidating immune response mechanisms
- Research on development of genetic engineering
- Research to develop non-destructive means of performing measurements at the biomolecular level with high sensitivity and resolution

- Research on development of new plant experiments
- Research on basic technologies for elucidating the infiltration and metastasizing mechanism of cancer cells
- Research on development of human gene mapping system
- Research to develop basic technologies that elucidate the structure and function of sugar chains
- Research on development of new animal experiments

(second phase research)

- Research on developing methods of analyzing and controlling bio-information transmission mechanisms

(3) Global science and technology

(new research)

- Development of basic technologies for upgrading remote sensing methods using microwave sensor data
- International joint research to elucidate mechanism by which matter circulates in remote ocean areas

(ongoing research)

- International joint research on atmospheric, oceanic, and climatic fluctuations in the Pacific Ocean
- International joint research on elucidating desertification mechanism
- International joint research to set up general observation system to elucidate major ocean circulations
- International joint research on interaction of atmosphere, hydrosphere, and biosphere at the North Pole

(4) Other basic and leading-edge science and technology research projects

(new research)

- Basic research to assist creativity in intelligent manufacturing

(ongoing research)

- Research to develop basic sensor fusion technologies
- Research on building self-organizing data-base system to assist R&D creativity

(second phase research)

- Research on fuzzy systems and applications in human/natural systems

2. Domestic and social sciences and technologies

(ongoing research)

- Research to upgrade methods for dealing with snow-fall accumulations
- General research to upgrade earthquake prediction methods for the Tokyo metropolitan area
- International joint research to develop methods for forecasting landslides in volcanically active areas

II. Basic Human Research

1. Interministerial research

Research in which international and interministerial research groups are formed around research leaders at national research laboratories

(ongoing research)

- Basic research on using PET to analyze information transmission mechanisms inside the brain
- Research on characteristics of electromagnetic radiation as warning signal of tectonic destruction
- Development and application of methods for measuring the abundance and isotopic carriers of elements that exist inside microscopic specimens
- Research to develop system for introducing genes to specific loci
- Elucidation of specialized regulating mechanism and species specific properties associated with formation of animal immune systems
- Research on elucidation of higher RNA structures and functions and applied research on synthetic ribozymes
- Research on functional materials with higher biological compatibility
- Research on mechanism by which substances migrate in a free surface
- Basic research to elucidate mechanism of high carbon coordination number
- Research on analyzing and evaluating the effects of intensive cancer treatments
- Biochemical research on new physiologically active factors contributing to mechanism which regulates circulation
- Research on elucidating structure and function of hormone bonding proteins by developing high sensitivity analysis techniques
- Research on elucidating structure and information processing mechanism of the brain/nervous systems in invertebrates
- Research on ways to measure and evaluate thermal properties of advanced film and fiber materials
- Research on magneto-optical effects of non-equilibrium substances

2. Domestic and regional mobile research

Research in which regional research groups are formed around regional core organizers based on the collaboration of government, industry, and academia

(new research)

- Ecological landscape research on catchment basin management in the context of preserving higher natural ecosystems (Hokkaido)
- Research on using biotechnology to develop useful resources from natural ecosystems of Toyama (Toyama)
- Research on cleaning up the urban environment starting with water for domestic uses

(ongoing research)

- Research on technologies for measuring and finding uses for bioradicals
- General R&D on specific ceramic structures formed by colloid processing
- Research to elucidate mangrove-based ecosystems
- Research to upgrade methods of monitoring the lake and marsh environments of Lake Biwa and improving water quality (Shiga Prefecture)
- Basic research on creating intelligent inorganic compounds and organic composites
- Research on elucidating the drought-resistance features in plants and their application to desert greening

III. Key International Research Exchange

Convening international workshops for the purpose of promoting the exchange international research based on cooperation agreements in science and technology

IV. Key International Joint Research Projects

International joint research at individual research laboratories based on cooperation agreements in science and technology

V. Interdisciplinary Research Exchange

Promoting areas of debate for the purpose of setting off interactions between researchers working in different fields in government, industry, and academia both inside and outside Japan

VI. Key Basic Research

Basic research at national research laboratories for the purpose of creating the seeds for new innovative technologies

VII. Surveys and Analyses

1. Basic surveys for drafting science and technology policies

- Survey on promotion of key policies

(new surveys)

- Science and technology activities oriented toward the next century
- Cultivating/ensuring supply of technical specialists
- Creating a competitive research environment
- Policies for strengthening/beefing-up cooperation in science and technology among Asian-Pacific countries
- Current status of U.S. government supported R&D

(ongoing surveys)

- Survey of policies promoting joint use of research equipment and facilities at national research laboratories
- Surveys promoting basic sciences and R&D in key fields

(new surveys)

- Future direction of R&D in leading-edge basic science and technology

(ongoing surveys)

- Survey on direction and growth of technology in Japan
- Survey on interdisciplinary research in natural sciences and human and social sciences

2. Surveys on selection of general research topics

(new surveys)

- Development of functional conversion materials by forming gradient structures
- Basic survey on ecomaterials for the purpose of protecting the global environment and making a more relaxed work environment
- Survey on basic technologies for developing photon sensing for extreme environments and the uses thereof
- Survey on molecular design and precision synthesis of pharmacologically active substances
- Survey to elucidate the energy and substance fluctuations in the oceans
- Survey on developing basic technologies for revolutionizing earth observation methods

VIII. Emergency Research During Fiscal Year

Responding to emergency situations that occur during fiscal year (includes emergency commissioned research)

Research Projects With AIST Participation

Research	Term	Particulars
I. General Research		
1. Basic and leading-edge science and technology (Substances/Materials) 1—International joint research to develop models which exhibit characteristics of advanced materials	1992-94 (Phase I)	In order to ensure the reliability of advanced materials having outstanding functions and characteristics, this research will attempt to elucidate the physical and chemical phenomena that form the basis of those characteristics, and along with that construct a model that predicts the material characteristics.
2—Basic research on producing materials in short time periods in microgravity environment	1992-94 (Phase I)	Using a drop tower which lends itself to producing a workable microgravity environment on earth both in terms of economic factors and operability, this project will attempt to (1) research technologies that involve short-term use of a microgravity environment, and (2) do basic research on creating materials involving short-term use of a microgravity in order to come up with new materials exhibiting a quality and functionality not previously seen before.
3—Basic research on creating intelligent materials through manipulation of atoms and molecules	1992-94 (Phase I)	With the increased demand for more diversity and sophistication in materials, and to meet the demand for developing advanced intelligent materials, i.e. those materials which respond intelligently to environmental conditions, this research will focus on (1) the use of atom spin coordination and structural control, (2) the use of spin coordination in chemical reactions, (3) the use of hemoprotein, and (4) developing basic technologies for creating intelligent materials through the use of polymers.
4—Research to develop technologies for generating, measuring, and utilizing extremely high vacuums	1993-95 (Phase II)	In order to perfect a technology for generating, measuring, and utilizing extreme high vacuums, which will be indispensable in the development of future materials used in science and technology fields, i.e. superlattices, this research will concentrate on (1) fabricating an advanced super-high vacuum pump and vacuum materials, (2) fabricating an advanced cold-cathode vacuum gauge and laser-beam excitation vacuum gauge, and (3) fabricating and applying an advanced drive mechanism and advanced surface properties.
5—Research to develop technologies for generating and utilizing vacuum ultraviolet light	1993-95 (Phase II)	Vacuum ultraviolet light (wavelength: 2 to 200 nm) is expected to form the foundation for raising the technological level of many science and technology fields, i.e., substances and materials, information and electronics, and life sciences. In that context, this joint research project will focus on (1) developing a technology for generating vacuum ultraviolet light, (2) developing optical elements, and (3) developing a basic technology for utilizing vacuum ultraviolet light.
6—Basic research on ways to use host/guest reactions to create new functional materials	1990-92 (Phase I)	In order to create materials with the same structure and shape but a completely different composition, or materials with the same composition but a completely different shape and structure, and perfect a basic technology for creating new functional materials and substances, this research will focus on creating materials by (1) composition conversion technology, and (2) composition-structure conversion technology using ion exchange host-guest reactions.
7—Basic research on material interconnections by creating ideal surfaces	1990-92 (Phase I)	In order to develop a process by which solid interfaces can be obtained with a given structure/function by synthesizing a method of fabricating and assessing surfaces and interfaces at the atomic level, this research will attempt (1) to develop theories and evaluate ideal surfaces and interfaces, and (2) create interfaces by means of ideal surface control.
8—Research on basic technologies concerned with non-destructive methods of quantitatively and intelligently evaluating materials and structures with high reliability	1991-93 (Phase I)	In order to perfect a basic technology for quantitative, intelligent, non-destructive methods for evaluating materials and structures requiring high reliability, this research will focus on (1) quantitative, ultrasonic non-destructive measurement methods, (2) mathematical models based on elastic wave theories, (3) applied artificial intelligence, and (4) development of prototype system for common board technology.

Research Projects With AIST Participation (Continued)

Research	Term	Particulars
9—Research on the measurement, evaluation, and control of element functions in substances and materials at the microscopic level	1992-93 (Phase II)	With a lot of attention focused on methods for directly evaluating the function of materials and substances themselves at the microscopic level, this research will focus on measuring and evaluating (1) surface element functions, (2) particulate and interface element functions, and (3) quantum size functions. The aim will be to develop a new method for measuring and evaluating element functions in very small microscopic areas while trying to improve advanced electronic, ion, and optical methods.
10—Research on constructing data bases for use in R&D on superconductive materials	1992-93 (Phase II)	It is a matter of great urgency to effectively and efficiently perfect a unified technology for evaluating superconductivity properties and quickly relay that data to parties inside and outside Japan, so the purpose of this research will be to (1) standardize an evaluation and measurement technology for all the properties in superconductive materials, and (2) develop a prototype data base.
(Life Sciences) 1—Research to develop a basic technology for elucidating bionanostructures	1992-94 (Phase I)	This research will attempt to develop an experimental system that will include direct observation by scanning microscope as a basic technology for elucidating the mechanism by which functions are exhibited at the nanometer level in a biomolecular complex made up of proteins with the aim being to uncover important functions in living organisms.
2—Research on development of non-destructive means of performing measurements at the biomolecular level with high sensitivity and resolution	1991-93 (Phase II)	In order to develop basic technologies for performing non-destructive measurements of biological tissues and substances at the biomolecular level, this research will concern itself with (1) developing a real-time method of measurement based on optical science and technology, and (2) creating a more advanced NMR technology using stable isotopes.
3—Research on development of new plant experiments	1990-92 (Phase I)	In order to systematically elucidate plant functions and create an applied technology base, this research will focus on developing new experiments whose aim will be to (1) elucidate generation and specialization mechanisms, (2) elucidate environmental response mechanisms, and (3) elucidate genes and genome.
4—Research on basic technologies for elucidating the infiltration and metastasizing mechanism of cancer cells	1990-92 (Phase I)	With the aim of developing a basic technology for elucidating the infiltrating, metastasizing, and secondary tumor forming mechanisms of cancer cells, this research will focus on how to analyze the (1) infiltration mechanism of cancer cells, (2) metastasis mechanism of cancer cells, and (3) formation mechanism of secondary tumors, and try to come up with basic knowledge and a technology for effectively controlling those processes.
5—Research to develop basic technologies for elucidating the structure and function of sugar chains	1991-93 (Phase I)	With the aim of developing a common basic technology for elucidating the biosynthesizing function and mechanism by which functions are identified in sugar chains, this research will focus on the (1) development of a technology for analyzing sugar chain functions that is linked to genetic engineering, (2) development of a technology for reconfiguring, recombining, and modifying sugar chains, and (3) development of structural analysis technology for complex sugar chains.
(Global Science and Technology) 1—Research to develop basic technologies for upgrading remote sensing methods using microwave sensor data	1992-94 (Phase I)	There has been a strong desire for more sophistication and diversity in the use of remote sensing in the field of global environmental monitoring involving the use of various optical and microwave sensors in satellites, therefore, this research will attempt to (1) develop a multiple-purpose remote sensing technology, (2) hold joint international R&D on environmental fluctuations in the tropical regions of the earth, and (3) upgrade the use of remote sensing in monitoring the oceans.

Research Projects With AIST Participation (Continued)

Research	Term	Particulars
2—International joint research to elucidate the mechanism by which matter circulates in remote ocean areas	1992-94 (Phase I)	With the aim being to increase biological productivity, and to elucidate the mechanism by which substances circulate in the oceans, this research will be conducted mainly around the East China Sea and will try to (1) elucidate the process by which substances derived from land and biological sources circulate in the oceans, and (2) will involve joint international research to elucidate the sedimentation and transport processes along the ocean bottom.
3—International joint research on elucidating desertification mechanism	1989-92 (Phase I)	Desert regions comprise one-third of the total land area of the earth and are growing at the rate of 60,000 square kilometers each year, thus there have been demands made to inquire into this phenomenon from a geoscientific perspective and develop basic technologies to stop this from occurring. Therefore, in cooperative joint research with China, this project aims to (1) elucidate the history of desert formation, (2) analyze the desertification status-fluctuation mechanism, (3) elucidate the relation between desertification and climate, (4) elucidate the ecosystem maintenance/recovery mechanism in semi-arid areas, and (5) simulate the desertification mechanism in order to prevent its occurrence.
4—International joint research to set up general monitoring system to elucidate major ocean circulations	1990-92 (Phase I)	In order to elucidate the major influences the oceans are believed to be having on global climatic changes, particularly major ocean circulations extending across wide areas deep under the oceans, these activities will be part of an international joint research project known as WOCE (World Ocean Circulation Experiment) and will focus on (1) using observation and analysis to elucidate the actual condition of major ocean circulations, (2) major ocean circulation research by mathematical models, and (3) observation systems needed for elucidating major ocean circulations.
5—International joint research on interaction of atmosphere, hydrosphere, and biosphere at the North Pole	1990-92 (Phase I)	With the objective being to observe North Pole regions believed to be most notably affected by global fluctuations, i.e. global warming and ozone layer depletion, this research will involve (1) monitoring various atmospheric phenomena, (2) monitoring processes by which heat, water, and materials are transported in the hydrosphere, (3) elucidation of climatic and environmental fluctuations from the ice floor, (4) ascertaining plant conditions, and analyzing and evaluating their effects on the hydrosphere, and (5) predicting and evaluating global-scale changes.
(Other Basic/Leading-Edge Science and Technology) 1—Basic research to assist creativity in intelligent manufacturing operations	1992-94 (Phase I)	In order to support individual and organizational creativity in intelligent manufacturing activities in scientific and technical fields, this project will involve basic research on (1) a system that supports individual creativity based on the knowledge and characteristics of the individual, (2) a system that effectively supports organizational creativity in the R&D process from the management level down, and (3) a system to support creative numerical simulation.
2—Research to develop basic sensor fusion technologies	1991-93 (Phase I)	In order to perfect sensor fusion (integration and merging of information from multiple sensors), which is indispensable in the automation and technical advancement of various equipment such as intelligent robots and medical equipment and apply the basic structure thereof, this research will focus on (1) basic structure of sensor fusion, (2) sensor fusion engineering, and (3) basic medicine tracing technology, which is a typical use of sensor fusion.
3—Research on building self-organizing data-base system to assist R&D creativity	1991-93 (Phase I)	In order to create an information system with highly developed human interfaces that enable multi-variable indeterminate information to be stored, managed, referenced, and presented in an innovative visual manner to researchers, and a system operation that does not become a burden to the researcher, this research will concentrate on (1) information resourcing formats, (2) basic self-organizing data base systems, and (3) advanced data base applications.

Research Projects With AIST Participation (Continued)

Research	Term	Particulars
4—Research on fuzzy-logic systems and applications in human and natural systems	1992-93 (Phase II)	This research will have great benefits for human society and industry. It has to do with "fuzzy" logic system applications that are able to deal quantitatively with previously unquantifiable ambiguous information originating primarily from human beings.
2. Domestic and social sciences and technologies 1—Research to upgrade methods for dealing with snowfall accumulations	1991-92 (Phase II)	In order to elucidate the phenomenon of snowfall accumulation and improve the environment in which people in snowfall regions live, this research will (1) elucidate the mechanism which causes snow to fall based on the latest monitoring methods and study the possibility of regulating snowfalls, and (2) develop snow treatment methods using ground heat and snow removal methods using snow transport pipelines.
2—International joint research to develop methods for forecasting landslides in volcanically active areas	1990-92 (Phase I)	In order to develop ways of forecasting the possibility of landslides in volcanically active regions directly in the line of danger from volcanic eruptions, and in areas where there is large-scale sedimentation movement and disaster intensity is extremely high due to topographical instability of steeply-inclined stratified structures, this research will focus on (1) locales where landslides have occurred, (2) the sedimentation process, and (3) disaster evaluation methods.
II. Basic Human Research 1. Interdisciplinary	1991	Research in which international and interministerial research groups are formed around research leaders at national research labs
2. Domestic/regional research	1991	Research in which regional research groups are formed around regional core organizers based on the collaboration of government, industry, and academia
III. International Joint Research	1992	In order to live up to our role as one of the advanced countries in the world and meet the expectations of the world community, AIST will take an active and comprehensive role in promoting cooperative international research. To do that, it will promote international joint research between independent governmental research laboratories in Japan and independent research institutions in other countries by arranging various science and technology cooperation agreements.
IV. Key Basic Research	1992	This area will focus on promoting basic research at national research labs so as to emphasize the independent creativity of researchers and to develop innovative technologies
V. Surveys and Analyses 1. Drafting science and technology policies 1—Survey on promotion of key policies	1992	In order to promote the key policies expressed in the government's 18th annual report on science and technology, this research will perform a comprehensive survey to ascertain the current status and future prospects of science and technology.
VI. Emergency Research During Fiscal Year 1. Emergency research 1—Emergency earthquake research around Nishiomote Island	1992	The aim of this research will be to gain an understanding of seismic and tectonic fluctuations and the temperature abnormalities that accompany earthquake activities in the area surrounding Nishiomote Island, and to analyze the geological and tectonic structures in order to contribute to research on earthquake predictions.

1992 Revised MITI Science and Technology Special Coordination Fund Budget (¥ 000)

	Research	Laboratory (Budget)
1	(General Research) International joint research on developing models that exhibit characteristics of advanced materials	Government Industrial Research Institute, Nagoya (687); Industrial Products Research Institute (8,188); Mechanical Engineering Lab (8,342); Fermentation Research Institute (9,184); Government Industrial Research Institute, Osaka (2,607); National Chemical Laboratory for Industry (2,346); Electrotechnical Laboratory (7,917)
2	Basic research on producing materials in short time periods in microgravity environment	Government Industrial Research Institute, Nagoya (12,946); Electrotechnical Laboratory (17,148); Government Industrial Research Institute, Osaka (13,322); Geological Survey of Japan (9,720); National Chemical Laboratory for Industry (5,156)
3	Basic research on creating intelligent materials through atomic/electronic manipulation	Fermentation Research Institute (19,685); Government Industrial Research Institute, Nagoya (11,036); Mechanical Engineering Lab (8,720);
4	Research to develop technologies for generating, measuring, and utilizing extremely high vacuums	Electrotechnical Laboratory (28,897)
5	Research to develop technologies for generating and utilizing vacuum ultraviolet light	National Chemical Laboratory for Industry (32,731)
6	Basic research on ways to use host/guest reactions to create new functional materials	Government Industrial Research Institute, Tohoku (20,135); National Chemical Laboratory for Industry (11,642)
7	Basic research on material interconnections by creating ideal surfaces	Government Industrial Research Institute, Osaka (9,922); Natural Research Laboratory of Metrology (46,593); Mechanical Engineering Lab (19,312)
8	Research on basic technologies concerned with the non-destructive quantitative and intelligent evaluation of materials and structures with high reliability	Mechanical Engineering Lab (20,089); Natural Research Laboratory of Metrology (7,775)
9	Research on measurement, evaluation, and control of element functions in substances and materials at the microscopic level	National Chemical Laboratory for Industry (20,308); Electrotechnical Laboratory 81,216
10	Research on constructing data bases for use in R&D on superconductive materials	Electrotechnical Laboratory (2,874)
11	Research to develop basic technologies for the purpose of elucidating bionanostructures	National Chemical Laboratory for Industry (27,000); Electrotechnical Laboratory (10,003)
12	Research to develop non-destructive means of performing high-sensitivity and high-resolution measurements at the biomolecular level	Mechanical Engineering Lab (30,560); National Chemical Laboratory for Industry (4,112)
13	Research on development of new plant experiments	Fermentation Research Institute (3,956)
14	Research on basic technology for elucidating the infiltration and metastasizing mechanism of cancer cells	Fermentation Research Institute (7,435)
15	Research to develop basic technology for elucidating the structure and function of sugar chains	National Chemical Laboratory for Industry (7,397)
16	Research to develop basic technology for upgrading remote sensing methods using microwave sensor data	Natural Research Laboratory of Metrology (6,571); Geological Survey of Japan (10,305); National Research Institute for Pollution and Resources (6,136)
17	International joint research to elucidate the mechanism by which matter circulates in remote ocean areas	Geological Survey of Japan (32,220); Government Industrial Research Institute, Chugoku (2,577)
18	International joint research on elucidating desertification mechanism	Geological Survey of Japan (5,536)
19	International joint research to set up monitoring system to study major ocean circulations	Geological Survey of Japan (13,543); Electrotechnical Laboratory (16,325)
20	International joint research on interaction of atmosphere, hydrosphere, and biosphere at the North Pole	National Research Institute for Pollution and Resources (1,303)
21	Basic research to assist creativity in intelligent production activities	Electrotechnical Laboratory (10,535); Industrial Products Research Institute (11,293)
22	Research to develop basic sensor fusion technologies	Industrial Products Research Institute (8,594); Electrotechnical Laboratory (42,986)
23	Research on building self-organizing data-base system to assist R&D creativity	Electrotechnical Laboratory (61,476)

1992 Revised MITI Science and Technology Special Coordination Fund Budget (¥ 000) (Continued)

	Research	Laboratory (Budget)
24	Research on fuzzy-logic system and applications in human and natural systems	Industrial Products Research Institute (9,238); Electrotechnical Laboratory (958); Government Industrial Research Institute, Chugoku (3,526); National Research Institute for Pollution and Resources (1,199)
25	Research to upgrade methods for dealing with snowfall accumulations	Government Industrial Research Institute, Tohoku (2,720); Natural Research Laboratory of Metrology (2,178)
26	Basic research to upgrade methods of predicting earthquakes in urban areas	Geological Survey of Japan (32,062)
27	International joint research to develop methods for forecasting landslides in volcanically active areas	Geological Survey of Japan (23,593)
28	(Interministerial Basic Research) Research to elucidate higher RNA structures and functions and applied research on synthetic ribozymes	Fermentation Research Institute (34,875)
29	Research on highly biocompatible functional materials	Research Institute for Polymers and Textiles (34,676)
30	Research on ways to measure and evaluate thermal properties of advanced film and fiber materials	Natural Research Laboratory of Metrology (57,145)
31	Research on magneto-optical effects of non-equilibrium substances	Electrotechnical Laboratory (60,944)
32	Basic research on catalytic action of metal and heterojunctions	Government Industrial Research Institute, Osaka (43,833)
33	Innovative enteric canal peptide and elucidation of genetic function	Fermentation Research Institute (69,160)
34	(Domestic and Regional Research) General R&D on specific ceramic structures formed by colloid processing	Government Industrial Research Institute, Kyushu (14,944)
35	Research to elucidate mangrove-based ecosystems	Government Industrial Research Institute, Kyushu (8,470); Government Industrial Research Institute, Chugoku (5,674)
36	Research to upgrade methods of monitoring the lake and marsh environments of Lake Biwa and improving water quality	Electrotechnical Laboratory (6,784); Government Industrial Research Institute, Chugoku (5,972)
37	Basic research on creating intelligent inorganic compounds and organic composites	Electrotechnical Laboratory (8,283); Government Industrial Research Institute, Osaka (9,101)
38	(International Joint Research) Research on extremely low-temperature two-phase flow in micro-gravity environment	Mechanical Engineering Laboratory (5,833)
39	Data processing with new optical elements	Mechanical Engineering Lab (2,462)
40	Research on chemical conversion and functional upgrade of carbohydrates	National Chemical Laboratory for Industry (4,530)
41	Research on high-temperature method of hydrogen enrichment using inorganic film	National Chemical Laboratory for Industry (4,015)
42	Research on functions of gaseous carbon products	National Chemical Laboratory for Industry (4,128)
43	Research on applications of graphite nanocomposites and metallic particles made from intergraphite compounds	Government Industrial Research Institute, Osaka (5,188)
44	Research on microdesign of hydrogen-occluded alloy surfaces	Government Industrial Research Institute, Osaka (4,263)
45	Signaling mechanism of cell division	Fermentation Research Institute (5,039)
46	Research to create geophysical models of the White Island volcano in New Zealand	Geological Survey of Japan (6,626)
47	Research on particle-shaped substances in the Pacific Ocean and Indian Ocean	Geological Survey of Japan (6,154)
48	Research on high-quality superconducting X-ray detection elements	Electrotechnical Laboratory (7,186)
49	Research on boiling two-component fluids in a microgravity environment	Electrotechnical Laboratory (6,855)
50	Optimization and compression characteristics of bolted joints in layered composite materials	Industrial Products Research Institute (3,733)
51	Research on biodegradable polymers made up of natural polymer components	Industrial Products Research Institute (3,080)

1992 Revised MITI Science and Technology Special Coordination Fund Budget (¥ 000) (Continued)

	Research	Laboratory (Budget)
52	Research on long-distance transport by measuring acidic substances on Cheju Island	National Research Institute for Pollution and Resources (6,164)
53	Basic research on combined system for thermal decomposition and combustion of coal	Government Industrial Research Institute, Hokkaido (4,693)
54	Research to evaluate metal-based composite materials	Government Industrial Research Institute, Kyushu (4,437)
55	Research to evaluate stress corrosion cracking in materials	Government Industrial Research Institute, Chugoku (2,198)
56	(Key Basic Research) 60 Items	379,529
57	("Soft" Research) Survey of current status of U.S. government supported R&D	Agency of Industrial Science and Technology (9,916)
58	(Emergency research) Emergency research on earthquake activities in areas surrounding Nishiomote Island	Geological Survey of Japan (10,752)
	Total	1,681,077

2. Other AIST Lab-Related Policies

1. Promotion of Cooperative International Research

There has been a trend taking place in recent years among countries of attaching great importance to so-called technological diplomacy. Technology is more often than not becoming the centerpiece of conversation between national leaders at local and international conferences.

As international acclaim for Japanese manufacturing techniques has grown, so too have the number of requests from advanced countries in Europe and North America to exchange technologies, which until recently thought they had very little to learn from Japan. Japan is continually being asked to take an active role at the international level and to enact policies that allow for exchanges of technology with developing countries.

Japan has also been asked to intensify the work it is doing to foster cooperative science and technology agreements between the United States and Japan, and to step up the work it is doing on global environmental issues where there has been much worldwide concern.

In that context, in FY93, AIST will extend invitations to foreign researchers to come to Japan in order to bolster its international research exchange programs and international research cooperation agreements involving global environment related technologies. In addition, it will enact some new programs as part of the New Energy and Industrial Technology Development Organization (NEDO) project to promote international industrial technologies.

(1) Promotion of International Joint Research and Research Cooperation

1—Specific International Joint Research Programs

AIST will try to promote joint R&D programs between its national research laboratories and those research institutes in advanced countries which share the same concerns. As for general research projects in 1993, in

addition to the three research projects being continued from the previous year, there are also three new joint research projects. With regard to international joint research on global environmental issues, in addition to the two projects from the previous year and one new project, there will be one new project having to do with multi-country frameworks for conducting specific joint research projects.

2—Cooperation Agreements with Developing Countries

a. International Trade and Industry Technology Program (ITIT Program)

This program has to do with resolving research issues and improving research with developing countries by applying the research potential of national research laboratories to cooperative research in the mining and manufacturing fields where the strongest requests have been made by developing countries.

In 1993, AIST will set up a new research cooperation program consisting of specific key research topics in which it will lend its technical support to developing countries to help them develop supporting industries essential to achieving economic independence. AIST also intends to upgrade and strengthen its research programs having to do with global environmental technologies in order to cope with the worldwide demands concerning environmental pollution, i.e. destruction of forests, acid rain, etc., that have become of increasing concern in recent years.

b. Research Cooperation Program

[Research cooperation on machine translation system for neighboring countries]

This program focuses on the development of a machine translation system that can provide translations between Japanese, Chinese, Thai, Malaysian, and Indonesian. It will be used to help resolve various economic and social issues shared by developing countries.

[Research cooperation on technology for recovering valuable resources from brackish water]

This is an R&D program that focuses on developing a comprehensive system for systematically recovering valuable resources such as lithium, barium, bromine, magnesium, and boron which can be found in brackish water from Mexican salt manufacturing plants and Chinese salt water lakes.

[Research cooperation on preserving and sustaining biological diversity]

This is an R&D program in which AIST labs will conduct cooperative research with Southeast Asia which has rich tropical rain forests, and is designed to enable them to harvest, preserve, and sustain the bioresources that exist in those rain forests.

(2) International Research Exchange Program

This is a research program that invites foreign researchers from countries that have exhibited the strongest interest in such programs. It will involve increasing the number of young foreign researchers invited to national research laboratories from countries that have indicated a particularly strong interest. The program also investigates the possibility of those researchers being accepted by private research institutes, which then will decide the subject matter to be researched.

The program also provides various support services such as a Japanese language training program, lifestyle adjustment advice, housing accommodations, and personal references in order to assist the foreign researchers in adjusting to the new lifestyle of Japan and to ease their acceptance at AIST laboratories.

(Budget) (unit: million yen)

Promotional Activity	FY92 Budget Proposal	FY91 Budget
1. International joint research and international research cooperation	445	(384)
(1) Special international joint research programs [general accounts]	117	(94)
(2) Cooperation with developing countries	328	(290)
1—International industrial technology research programs [ODA]	300	(265)
2—Programs promoting research cooperation programs (research lab portion) [ODA]	28	(25)
2. International research exchange programs [general accounts]	258	(216)
Lab costs	23	(19)
Outside lab costs	234	(197)
Total	703	(600)

2. Program Promoting Basic Research Facilities

As R&D in the area of industrial technologies has increased, the facilities required to conduct that R&D have gotten larger and become more specialized. This has made it cost ineffective for individual companies and research organizations to purchase advanced research and development facilities. This program, based on private funding alone, provides companies with the facilities and researchers they will need to conduct advanced research.

The operation and upkeep of the facilities is based on the law pertaining to industrial technology R&D (1988 Law No. 33), and is carried out by corporations designated by the New Energy Development and Industrial Technology Organization (NEDO).

Completed Projects Outlined

(1) Underground Zero-Gravity Experimental Research Center (location: Kami-Sunagawa, Hokkaido)

The center is made from an existing shaft of an old coal mine and equipped with vertical free-fall equipment and is used to conduct various types of short-term (10 seconds) zero-gravity experiments. The center was founded in March, 1989, and a portion of the facility was opened for public use in 1991.

(2) Super High-Temperature Materials Research Center (locations: Ube City, Yamaguchi Pref.; Tajimi City, Gifu Pref.)

These are two facilities that were built for the express purpose of conducting research and evaluation on the physical properties and functions of materials under very high temperatures.

(3) Mining and Manufacturing Applied Research Center on Marine Life Uses (locations: Kamaishi City, Iwate Pref.; Kiyomizu City, Shizuoka Pref.)

These centers were built for conducting research on marine life uses for the mining and manufacturing industries. The center was founded in November, 1988, and opened for use in 1990.

(4) Ion Engineering Center (location: inside Kansai Cultural Science Research City in Hirakata, Osaka)

This facility was built for conducting research on ion beam applications for industry. It was founded in November, 1988, and opened for use in 1992.

(3) Laser Application Engineering Center (location: Nagaoka City, Niigata Prefecture)

This facility was built for doing research on laser applications in industry. The center was founded in March, 1990, and fully opened for use in 1992.

Furthermore, for the leading-edge basic investigative research programs of the type that would make use of the research facilities opened in 1992, we have selected those leading-edge basic research projects which have the possibility of being tied to R&D in the future which would make use of those facilities, and have started investigative research on ways of implementing uses of those basic research facilities.

In 1993, NEDO has been allocated ¥300 billion in general grant money.

3. Regional Technology Exchange Program

(policies regarding research exchange and technology mergers)

As science and technology have evolved, regional companies have become more actively involved in research and development. This has created new research and technology needs rooted in the unique industrial characteristics of those particular regions. In that context, the expectations placed on national research laboratories established in respective regions of the country are growing every year. In truth, however, those expectations have not been met because the research laboratories in those areas lack the necessary human and technical resources.

Looking back at the rapid progress made in recent years in science and technology, we take note of how specialized research has become and the fact that mergers have taken place between various research fields. In order to make the best use of limited human and financial resources in those national research laboratories and conduct effective research, this program will try to identify the "seeds" of new research and give more careful thought to research projects and how they relate to new theories and phenomena.

For that reason, this program will try to address regional research and technology needs by examining the research potential existing in both regional research laboratories and Tsukuba research laboratories.

With regard to specific activities, the program will send top-level researchers from AIST for temporary periods of time to places doing leading research in those particular regions. These researchers will try to ascertain the direction of research and the research needs in those particular regions by conducting experiments and holding discussions at those research facilities.

(Program Outline)

(1) Regional Research and Technology Needs

To deal with regional research and technology needs in each geographical region, local research laboratories in each region have been conducting research by establishing research topics that concern the particular needs of their respective region. In certain cases where difficulties have

been encountered implementing this research, AIST research labs offer the support of researchers working in Tsukuba research laboratories who try to help them solve the particular problems at their laboratories, thereby providing an effective and appropriate response to the regional needs of these research laboratories.

In addition, certain researchers from Tsukuba research laboratories are assigned for fixed periods of time (a few years) as research exchange officers to regional research laboratories, and several times a year for periods of a few weeks each. These researchers are sent to their assigned regional research laboratory to provide general research assistance, e.g. identifying research projects. More specifically, by putting those researchers in a research advisory role, this program tries to improve the research potential in particular research fields at particular research laboratories. It targets personnel development and tries to deal appropriately with the research and technology needs of each research laboratory.

(2) Centralized Research Labs With Researchers From Various Labs

The program seeks to identify the "seeds" of new research related to particular research fields by having researchers from research laboratories with different advanced research agendas discuss the problems they are confronted with in their fields of study for fixed periods of time at a centrally located place.

(Budget: unit - million yen)

General Account	FY92 Budget Proposal	FY91 Budget
Policies promoting research exchange and technology mergers	29	(27)

4. Japan Key Technology Center Program

In November, 1985, the Japan Key Technology Center was opened in order to promote experimental research. It was designed primarily to support basic and applied research by private industry which accounts for around 80 percent of the R&D expenditures in Japan. The FY93 budget proposal to fund such programs, which are its main activities, is ¥28.5 billion. This contains ¥26 billion for funding the special industrial investment account, and ¥20 billion for loan recovery.

The total 1992 budget for programs was ¥28.5 billion with ¥26 billion being earmarked for the special industrial investments and ¥2.5 billion for loan recovery.

Below, we list the basic activities of the Japan Key Technology Center.

(1) Capital Investment Program

This program invests in corporations which have been established jointly by two or more corporations. The companies must conduct experimental research on basic technologies beginning at the basic and applied research stage (investment ratio under 70 percent).

Number of New Investments (unit: investments)

	FY89	FY90	FY91	FY92c
R&D projects (includes mining and manufacturing fields)	3 (1)	3 (1)	3 (2)	5 (3)
New media communication, Teletopia	4	0	0	0
Total	7	3	3	5

(2) Loan Program

This program makes conditional interest-free loans to companies conducting experimental research related to basic technologies starting mainly from the applied research stage (loan ratio under 70 percent).

Number of New Loans (unit: loans)

	FY89	FY90	FY91	FY92
Loans (includes mining and manufacturing fields)	26 (11)	34 (13)	29 (12)	22 (11)

(3) Joint Research Mediation Program

This program provides mediation in experimental research projects to assist private companies in concluding joint research agreements on basic technologies with national research laboratories.

(4) Overseas Researcher Invitation Program (International Research Cooperation Japan Trust Program)

This program uses public trust funds to extend invitations to top overseas researchers.

(5) Basic Technologies Information Program

This program is designed to collect a wide variety of information on basic technologies that are in the possession of national research institutions. The information is then repackaged and redistributed.

(6) Survey Program

This program conducts various surveys in order to help promote experimental research on basic technologies in the private sector.

Budget (unit: million yen)

Activity	FY93 Budget Proposal	FY92 Budget
1. Industrial capital investment special account Includes: Capital investment Loans	260 215 45	(260) (220) (40)
2. Self-funding Includes: Loan recovery	60 20	(56) (25)
3. Program total Includes: Capital investment Loans	280 215 65	(285) (220) (65)

5. Research Findings and Technology Surveys and PR

(1) Research Findings

The research findings obtained through both research laboratories operated by the Agency of Industrial Science and Technology (AIST) and through various AIST-commissioned R&D programs are the licensed property of the Agency of Industrial Science and Technology, and gaining access to those findings is done by paying an appropriate royalty for their use. Obtaining access to those results has gotten easier recently, particularly for overseas parties wanting that information. In FY93, therefore, AIST will try to disseminate its research findings over a wider area by stepping up PR and mediation activities on AIST industrial property rights. It will also try to prevent improper use of those rights by implementing proper control measures regarding their property rights.

(2) Technical Surveys and PR

In order to sustain sound economic growth in the face of environmental changes brought about by Japanese industry both inside and outside Japan, it is essential that technology be developed in a comprehensive and effective manner. When it comes to promoting the development of technology, AIST must draft comprehensive and relevant technical policies and increase the level of recognition and understanding of those policies and measures. To do that, the following steps are being taken:

1—Technical Surveys

This involves doing surveys on R&D trends both inside and outside Japan, evaluating the development of a technology, trying to come up with the best ways to make

research predictions, and incorporating this information into the planning and drafting of technical policies.

2—PR

In addition to conducting PR related to preparation and distribution of materials related to AIST operations and achievements, this involves consolidating technical materials from both inside and outside Japan.

(3) Developing Computer Applications

In addition to operating the Computer Application Research Association established by the AIST executive committee and the investigative research on technical problems faced in specialized fields which must increase the use of the computers in government bureaus and ministries, this program is aimed at developing such things as fuzzy logic applications, methods of assessing the introduction of software, and computer applications. It also includes promoting the use of research findings and trying to improve applied computer technologies and other new technologies.

(Reference)

In terms of the technical issues that administrative fields are facing in implementing the use of the computer, the Applied Computer Technology Research Association, which was formed in 1968 and has a technical staff of 610 members spread throughout 29 ministries and agencies, will undertake the following activities with the help of the people responsible and knowledgeable about computer applications in ministries and agencies to conduct multifaceted investigative research.

1—Survey on present status and trends inside and outside Japan regarding latest computer applications.

2—Computer applications that can be shared by various ministries and agencies.

3—Technical exchanges between ministries and agencies in order to raise the level of computer applications.

4—Dissemination and use of research findings by joint announcements and PR releases.

(Budget (unit: million yen))

Activity	FY93 Budget Proposal	FY92 Budget
1. Research findings		
(1) Administrative costs and processing costs for domestic filing	43	(41)
(2) Overseas application costs on government-owned patents	145	(122)
(3) Research expense on patent infringement protection	3	(3)
Total	191	(166)
Includes: General accounts	174	(159)
Special accounts	17	(16)
2. Promotion of technical surveys and PR activities		
(1) Technical surveys and PR activities	25	(25)
(2) Focus groups on industrial technologies	2	(2)
(3) Surveys and developing research management system and forecasting system for inside/outside Japan	5	(5)
Total	33	(33)
3. Developing computer applications	37	(37)

FY92 Joint Research of AIST Labs and Japanese Companies, Other Labs

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[Text]

1992 Joint Research Projects

AIST Lab	Research Project	Research Partner	Term
National Research Laboratory of Metrology	R&D on secondary low-vacuum pressure standard	Nagano Instrument Manufacturing, Ltd.	07-01-88 - 03-31-93
	Development of CAMPS compatible ceramic injection molding system	Yamashiro Precision Manufacturing, Ltd.	11-01-89 - 03-31-93
	Research on sensitive calibration method for supersonic search unit	Rion Co., Ltd.	07-01-90 - 03-31-92
	Research on three-dimensional measurement system	Tokyo Seimitsu Co., Ltd.	07-01-90 - 03-31-93
	R&D on helical standard flow meter	NEC Instrument Industries	08-01-90 - 03-31-93
	Development of magnetic temperature sensor	Anritsu Corporation	10-01-90 - 03-31-93
	Research to improve reliability of gas flow meters	Nippon Tairan, Co., Ltd.	01-01-91 - 03-31-93
	Research on pressure measurement techniques and apparatus	Oval Engineering Co., Ltd.	04-15-91 - 03-31-93
	Research on frequency constriction stabilization in titanium-sapphire lasers	Komatsu, Ltd.	04-15-91 - 03-31-93
	Research on scanning probe microscope for observing organic film	Nikon Corporation	06-01-91 - 03-31-93
	Research on practical application of AE sensor calibration method used in civil engineering to quantitatively analyze cracking by AE method	Kumamoto University Engineering Department	06-01-91 - 03-31-93
	Research on super high-vacuum AFM	Tokyo University Engineering Department	07-01-91 - 03-31-93
	Research on technology for measuring shape of megastructures	Nobeyama Cosmic Radio Observatory	07-01-91 - 03-31-93
	Research on technology for applying measurement of phase-conjugated waves	Suzuki Corporation	07-01-91 - 03-31-93
	Research on precision measurement of distances using photoconducting wave path modulators	Nikon Corporation	08-01-91 - 03-31-93
	Research on means of detecting combustible gas by optical methods	Osaka Gas Co., Ltd.	08-01-91 - 03-31-93
	Research on means of analyzing concentration of highly pure standard CO ₂ gas	Chemical Inspection Association	08-12-91 - 03-31-93
	Research to test characteristics of industrial high-temp platinum resistance thermometer	Nesshin Co., Ltd.	08-20-91 - 03-31-92
	Research to develop low-resistant high-temp platinum resistance thermometer	Chino Corporation	09-10-91 - 03-31-93
	Research on high-sensitive infrared detection using metallic superconductors	Ibaraki University Engineering Department	11-01-91 - 09-30-93
	Research on micromachining for micromachines	Sumitomo Precision Products Co., Ltd.	11-01-91 - 03-31-93
	Research to develop and find applications for high sensitivity sonic venturi nozzles	Nihon Keiryō Kiki Kogyo Rengokai	04-15-92 - 03-31-93
	Research on evaluating characteristics and calibrating industrial-type thermal flow meter	Denki Kagaku Keiki Co., Ltd.	04-20-92 - 03-31-93
	Research on semiconductor lasers and the applied technologies thereof	Idec Izumi Corporation	04-20-92 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
National Research Laboratory of Metrology (continued)	Research to evaluate micronanometer calibrating devices	Tsubari Kaseiki Co., Ltd.	06-15-92 - 03-31-93
	Research on optical quality control technology	Ishikawajima-Harima Heavy Industries Co., Ltd.	08-03-92 - 03-31-93
	Research on technology for measuring the frequency of 1.55 μ semiconductor laser	Yokogawa Electric	08-03-92 - 03-31-93
	Miniaturization research on differential interferometer that magnifies optical path difference	Nikon Corporation	08-03-92 - 03-31-93
	Research to measure reflective properties of rendezvous radar cube corner reflector array	National Space Development Agency	08-17-92 - 03-31-93
	Research on functional stability of laser frequencies	Nihon Chemical Engineering Co., Ltd.	09-16-92 - 03-31-93
	Research on method of evaluating accelerometer characteristics using a Davis bar	Matsushita Inter-Techno Co., Ltd.	11-04-92 - 03-31-93
	Research on methods of evaluating highly viscous materials by precision measurement of elastic viscosity	Ibaraki University	11-04-92 - 03-31-93
	Research on long-period tremor resistant system	Tokyo University Cosmic Radiation Research Lab	11-16-92 - 03-31-93
	Research to develop quality engineering software and incorporate in system engineering	Nachi-Fujikoshi Corporation	12-07-92 - 03-31-93
	Research to measure spectral emissivity of cold steel sheet surface	Sumitomo Metal Industries, Ltd.	01-05-93 - 03-31-93
	Research on high-temperature characteristics of nuclear fusion reactor materials	Japan Atomic Energy Research Institute	01-25-93 - 03-31-93
	Research on microdimensional standards for electron beam measuring devices	Hitachi Ltd.	01-28-93 - 03-31-93
	R&D on modifiable integrated manufacturing system	Yamazaki Mazak Corporation	02-22-93 - 03-31-93
Mechanical Engineering Laboratory	Research on ways to adapt logic programming environments for creating intelligent processing systems in machine design and manufacture	Next Generation Computer Technology Development Organization	02-25-87 - 03-31-93
	R&D on fluid-injected gas engines	Mitsui Engineering and Shipbuilding Co., Ltd.	02-15-90 - 03-31-93
	Research on low-temperature ultrasonic microscope scanner	Olympus Optical Co., Ltd.	10-08-90 - 03-31-93
	Research on formal draft of CAD/CAM data conversion processing system	Japan Computer Graphics Association	12-01-90 - 03-31-93
	Axially laminated C/C rotor prototyping and strength analysis	Toho Rayon Co., Ltd.	09-01-90 - 03-31-93
	R&D on diesel exhaust gas trap regeneration technology	Riken Corporation	11-01-91 - 03-31-93
	Research on advanced surface modification technology	Machine Technology Association	01-06-92 - 03-31-93
	Research on comprehensive model for building next-generation production systems	Toyo Engineering Corporation	02-01-92 - 03-31-92
	Research on high-speed particle testing and processing methods	Ishikawajima-Harima Heavy Industries Co., Ltd.	05-01-92 - 03-31-93
	Research on design and prototype of aircraft that fly through the stratosphere	Japan Industrial Technology Association	06-15-92 - 03-31-93
	Research on micromachine materials	Micromachine Center	09-01-92 - 03-31-93
	Research on ways of controlling steering in automated vehicles	Nissan Motor Corporation	11-01-92 - 03-31-93
	Research on LPG diesel engines	Ishikawajima-Shibaura Machinery Co., Ltd.	10-01-92 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
National Institute of Materials and Chemical Research	R&D on new photosensitive materials	Konica Corporation	04-25-89 - 12-31-92
	Research on use of high pressure to synthesize heterocyclic compounds containing nitrogen	Konica Corporation	08-01-90 - 03-31-93
	R&D on new compression-type heat pump refrigerants	Research Inst. of Innov. Technologies for the Earth	10-01-90 - 03-31-92
	Research on high-efficiency CO ₂ separation film	Research Institute of Innovative Technologies for the Earth	12-01-90 - 03-31-93
	Biodegradable plastics R&D	Research Institute of Innovative Technologies for the Earth	01-07-91 - 03-31-93
	Research on hydrogen-occluded alloy electrodes for use in nickel-hydrogen batteries	Shin-Kobe Electric Machinery Co., Ltd.	04-15-91 - 03-31-93
	Research to develop ceramic molds for forming advanced composite materials	Hebinome Machine Industries Co., Ltd.	05-01-91 - 03-31-93
	Research on photochemical treatment of plastic film	Seed Co., Ltd.	05-15-91 - 03-31-92
	R&D on new fluoroplastic materials	Seed Co., Ltd.	07-10-91 - 03-31-93
	Basic research to improve low-temperature activation of catalysts in M85 diesel auto mufflers	Petroleum Energy Center	08-01-91 - 03-31-93
	Research on acoustical characteristics of polymer materials	Hitachi Construction Machinery Co., Ltd.	08-01-91 - 03-31-93
	Developing ways of using biopolymer materials	National Institute of Sericulture and Entomological Science	08-01-91 - 03-31-93
	Research pertaining to R&D on advanced chemical processing pertaining to light reactions, film formation, electrode interface reactions, combined reactions, synthesis of furan resin derivatives, and means of diagnosing reactions	Advanced Chem. Processing Technology Research Assn.	09-03-91 - 03-31-92
	Development of polyurethane for use as raw material in extracting coffee lees	UCC Uejima Coffee Co., Ltd.	11-01-91 - 06-30-92
	R&D on endocytosis-type molecular recognition drake reaction system	Biotechnology Development Research Cooperative	12-01-91 - 03-31-93
	Research on impact reaction mechanism and sintering of intermetallic compounds	Tokyo University Engineering Department	01-20-92 - 03-31-93
	In R&D to develop NO _x removal system based on precious metal composite oxide catalyst. includes basic research on NO _x catalysts as well as research to upgrade catalysts	Petroleum Energy Center	04-01-92 - 03-31-93
	Research to analyze/assess chemically functional materials by means of synchrotron orbital radiation	Nippon Oil, Shukko Kyosan, Kosumo Oil, Kyoa Oil, Nippon Mining, General Sekiyu, Tonen, Showa Shell	04-01-92 - 03-31-92
	Research on new catalysts for upgrading coal liquefaction oil	Shokubai Kasei Kogyo Co., Ltd.	04-10-92 - 03-31-93
	Research to seek out suitable cylinder material for storing arsine gas	Nippon Sanso K.K.	04-13-92 - 03-31-93
	Research to synthesize cubic tungsten carbonate by thermal plasma method	Nippon Koshuha Ltd.	04-13-92 - 03-31-93
	Structural research on carbonaceous substances under very high pressure using Raman scattering	Institute for Solid State Physics, U of Tokyo	04-28-92 - 03-31-92
	Research on safety management of solid rocket propellants	National Space Development Agency	06-01-92 - 03-31-93
	Research to synthesize silicate compounds by double-sealed dehydrogenation	Mitsui Toatsu Chemicals, Inc.	06-01-92 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
National Institute of Materials and Chemical Research (continued)	Research on structural design and analysis of organically dispersed non-linear photo-electronic materials	Mitsui Toatsu Chemicals, Inc.	06-01-92 - 03-31-93
	Research on separation of dicyclic and tricyclic aromatics using polymer film	Petroleum Energy Center	06-01-92 - 03-31-93
	Research to prototype oxide films by gas synthesis method	Shinko Electric Industries Co., Ltd.	07-01-92 - 03-31-93
	Research to synthesize aromatic alcohol from aromatic carboxylic acid	Nippon Steel Chemical Co., Ltd.	07-10-92 - 03-31-93
	Research on adsorbents and isolating agents for complex proteins	Science U of Tokyo, Science/Engineering Dept.	07-16-92 - 03-31-92
	Basic research to produce microscopic particulate by hybrid high-frequency plasma method and research on non-destructive analysis of graded materials	Advanced Chemical Processing Research Assn.	07-20-92 - 03-31-93
	Research to generate convergent shock waves	Kumamoto University	08-12-92 - 03-31-93
	Research on aryl-alkyl-carboxylic acid and reduction catalysts from esters thereof	Senken Fine Chemicals Co., Ltd.	08-31-92 - 03-31-93
	Research to develop coating methods by electromagnetic acceleration method	Japan R&D Center for Metals	10-01-92 - 03-31-93
	In R&D to upgrade operations of commercial nuclear power plants, research having to do with configuration, measurement, and evaluation of touch-sensitive facial heating elements	Human Lifestyle Research Center	10-09-92 - 03-31-93
	Research on shock induced chemical reactions based on real-time analysis	Nippon Oil and Fats Co., Ltd.	11-01-92 - 03-31-93
	Research to predict properties of ringed nitramine compounds	Nissan Motor Corporation	11-17-92 - 03-31-93
Government Industrial Research Institute, Osaka	Research on use of glass and carbon-fiber reinforced plastic (CFRP) in large-scale construction projects [joint public-private sector research]	Hyogo Pref. Industrial Technology Center, Asahi Glass Co., Nippon Sheet Glass Co., Nippon Steel Corporation, Toho Rayon Co., Toray Industries, Nippon Oil Co., Mitsubishi Chemical Industries, Mitsubishi Rayon Co., Mitsubishi Heavy Industries	07-01-90 - 03-31-93
	Research on advanced surface treatment methods for processing materials [key regional technology R&D]	MITI Inspection Office, Fukui Ind. Tech. Center, Shiga Ind. Tech. Center, Wakayama Ind. Tech. Center, Kyoto Small-Medium Business Research Center, Osaka Ind. Tech. Research Institute, Osaka Municipal Ind. Research Institute, Hyogo Ind. Research Center, Okayama Ind. Research Ctr., Saga Ceramics Research Institute, Ion Research Institute	11-30-89 - 03-31-93
	R&D on basic marine life technologies [R&D on methods of manufacturing advanced chemical (marine life) products]	Biotechnology Development Research Cooperative	10-01-92 - 03-31-93
	Research on internal connector materials for lanthanum chromite solid electrolyte fuel cell	Osaka Gas Co., Ltd.	04-20-92 - 03-31-93
	Research on carbon hybrids to form 3D latticework	Shikibo, Ltd.	04-01-91 - 03-31-93
	Development of on-site foam adsorbents and evaluation of oil adsorptivity	Toyo Tire and Rubber Co., Ltd.	10-01-90 - 03-31-93
	Research to elucidate internal structure of pitch carbon fibers	Petoka Co., Ltd.	04-01-91 - 03-31-93
	Research to evaluate long-term durability of glassified waste products	Power Reactor and Nuclear Fuel Development Corp.	10-30-92 - 03-31-93
	Research on carbon use in lithium storage batteries	Osaka Gas Co., Ltd.	04-15-91 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
Government Industrial Research Institute, Osaka (continued)	Research to evaluate high-temp properties of carbon and carbon composites	Research Institute of Carbon Materials	07-01-92 - 03-31-93
	Research on technology for analyzing microstructures [R&D on non-linear photoelectric materials]	Asahi Glass, HOYA Corp., Mitsui Toatsu Chemicals, Matsushita Electric	12-01-90 - 03-31-93
	Research on a new solid electrolyte fuel cell	Kansai Electric Power Co., Osaka Gas Co., Yanmar Diesel Engine Co., Nisshin Electric Co.	02-01-91 - 03-31-93
	Study on complete system for generating large amounts of hydrogen (R&D on effective uses of CO ₂ fixing by contact hydrogenolysis)	Research Institute of Innovative Technologies for the Earth	04-01-91 - 03-31-93
	R&D on heat-resistant composites [leading-edge regional technology R&D]	Osaka Pref. Industrial Technology Research Institute, Fukui Industrial Technology Center, Wakayama Industrial Technology Center, Osaka Gas	09-02-91 - 03-31-93
	Research on ceramic flame-coated materials and flame-coated film	Nihon Kenmazai Kogyo Co., Ltd.	06-01-92 - 03-31-93
	Research on correcting/evaluating film catalysts [R&D on advanced chemical processing]	Adv. Chemical Processing Technology Research Assn.	10-01-91 - 03-31-93
	Research on catalytic characteristics of semiconductors and precious metal composite structures [independent creative research training program entitled "Light and Matter"]	Research Corporation of Japan (JRC)	02-01-92 - 03-31-93
	Research on controlling orientation properties of perovskite oxide films [R&D on advanced chemical processing technologies]	Adv. Chemical Processing Technology Research Assn.	07-20-92 - 03-31-93
	Research on reactions of carbon materials	SEC Co., Inc.	07-01-92 - 03-31-93
	Research on prototyping hydrogen-occluded alloy electrode	Toyota Motor Corporation	10-01-92 - 03-31-93
	Research on super-high-temperature adiabatic coating	Engineering Research Assn. for SST-HST Propulsion System	11-17-92 - 03-31-93
	Research to analyze materials by FT Raman scattering method	Nissin Trading Co., Ltd.	12-01-92 - 09-30-93
	Research on design manual for environment-friendly catalysts	Research Institute of Innovative Technologies for the Earth	12-17-92 - 03-31-93
	R&D on chemical processing of advanced biomaterial	Foundation of Osaka Science/Technology Center	12-25-92 - 03-31-93
Government Industrial Research Institute, Nagoya	Research to develop vessel-organ contrast mediums	Midori Juji	07-01-91 - 03-31-93
	Research on microstructural control of ceramic composites	Ibaraki University	07-01-91 - 03-31-93
	Research on high-temperature properties of ceramics	Mitsubishi Gas Chemical Co., Inc.	08-30-90 - 03-31-93
	Research to synthesize nitrous perfluoroalkylbromides	Tokem Products Co., Ltd.	10-15-90 - 03-31-93
	Research to develop new fluoroactive compounds	Nihon Oil and Fats Co., Ltd.	06-15-90 - 03-31-93
	Research on measurement of uranium oxide melting point	Nuclear Fuel Industries Co., Ltd.	08-01-88 - 03-31-93
	Research to synthesize/evaluate fluoro-derivatives of natural physiologically active substances	Nippon Kayaku Co., Ltd.	12-19-90 - 03-31-93
	Research on advanced ceramic bioreactor system	Chuo Equipment and Engineering Co., Ltd.	12-04-91 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
Government Industrial Research Institute, Nagoya (continued)	Research on high-performance thermistor	Nissei Electric Co., Ltd.	11-20-91 - 03-31-93
	R&D on superconducting ceramics	Int'l. Superconductivity Technology Center	10-01-91 - 03-31-93
	Research on reducing NO _x by electrically charged catalyst	Nissan Motor Corporation	06-01-92 - 03-31-93
	Research to develop photocatalytic water treatment device	Aiwa Corporation, Kato Kikai Seisakusho	06-15-92 - 03-31-93
	Research on selective optical divisioning by fluorocompound enzymes having plant growth control activity	Amano Seiyaku Co., Ltd.	07-01-92 - 03-31-93
	Research to analyze gas generated from casting molds when casting	Japan Foundry Association	07-15-92 - 03-31-93
	Research on laser machining of ceramics	Saito Kogyo Co., Ltd.	08-01-92 - 03-31-93
	Research on whisker surface reforming	Otsuka Chemical Co., Ltd.	08-17-92 - 03-31-93
	Research on ceramic surfaces using a laser	Techno Chubu Co., Ltd.	09-03-92 - 03-31-93
	Research on manufacture of porous ceramic openings using atomized oxide	Daito Co., Ltd.	10-01-92 - 03-31-93
	Research to commercialize reverse-shift catalysis	Cosmo Research Institute, Cosmo Engineering Co., Ltd.	11-10-92 - 03-31-93
	Research to synthesize fluoruous liquid crystal compounds	Akita University, Tokem Products Co., Ltd.	12-01-92 - 09-30-93
	Research on fiber-reinforced SiC composite using a silicon precursor	Petroleum Energy Center	12-01-92 - 03-31-93
	Research on composition of clays with weak plasticity and the methods of shaping those clays	Kutani Kiln Research Institute, Ishikawa Pref., Tajimi City Ceramic Design Institute	04-01-92 - 03-31-93
	Research on molding near net shapes by casting	Daido Steel Co., Fuji Electric Co., Nissan Chemical Industries	04-01-92 - 03-31-93
	R&D on synthesis of artificial clay for new ceramics (synthesis technologies for artificial clay) (applied technologies for artificial clay)	Artificial Clay Assn., Mie Ceramics Research Lab, Ishikawa Industrial Research Lab, Toyama Industrial Technology Center, Gifu Ceramics Research Lab, Shiga Pref., Shigaraki Ceramics Research Lab, Aichi Pref., Seto Ceramics Center	12-01-92 - 03-31-93
National Institute of Bioscience and Human Technology	R&D pertaining to finding and manufacturing useful substances	Biotechnology Development Research Cooperative	06-25-90 - 03-31-93
	Research on secretory production of human lysozyme by yeast	Nippon Oil Co., Ltd.	04-25-90 - 03-31-93
	Research on physiologically active platinum compounds	Sankyo Corp	10-26-90 - 03-31-93
	Research on secretory production of carboxypeptidase Y by yeast	Higashi Nippon Gakuen University	04-22-91 - 03-31-93
	R&D on exocytosis-type molecular recognition and reactive control system	Biotechnology Development Research Cooperative	04-01-92 - 03-31-93
	Research on synthesis, utilization, and remodeling of complex sugars using biotechnology	Biotechnology Development Research Cooperative	11-05-92 - 03-31-93
	Development of replacement materials for tortoise shell by integrating natural insect polymers	Tortoise shell Association of Japan	01-29-92 - 03-31-93
	R&D on producing valuable substances by microorganic conversion of oil distillates, i.e. polynuclear aromatic hydrocarbons	Petroleum Energy Center	10-01-90 - 03-31-93
	Research to search for more effective microorganisms as it pertains to functional group compounds from oil components	Petroleum Energy Center	10-01-90 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
National Institute of Bioscience and Human Technology (continued)	Research to search for physiologically functional substances in water extracted from beefsteak (shiso) leaves	Hokuren Agricultural Cooperative	11-10-92 - 03-31-93
	Research on breakdown of sulphur compounds by oceanic bacteria	Marine Biotechnology Research Institute	04-13-92 - 03-31-93
	Research on interaction between liver cells and organ cells	Tabai Espec Corporation	04-12-91 - 03-31-93
	Research to look at R&D on basic marine life technologies	Marine Biotechnology Research Institute	06-25-90 - 03-31-93
	R&D on photolytic system based on physical chemistry	Biotechnology Development Research Cooperative	04-01-92 - 03-31-93
	Research on a new lectin in an American crab species that specifically binds sialic acid	Taiyo Fishery Co., Ltd.	04-15-92 - 03-31-93
	Research to investigate and make improvements to photosynthesizing microorganisms	Research Institute of Innovative Technologies for the Earth	12-18-91 - 03-31-93
	R&D on biodegradable plastics	Research Institute of Innovative Technologies for the Earth	12-19-90 - 03-31-93
	Research on agglutinating ability of yeast	Toyo Engineering Co., Ltd.	04-30-91 - 03-31-93
	Research to improve functional characteristics of yeast	Godo Shusei Co., Ltd.	06-08-90 - 03-31-93
	Research to develop advanced enzymes	Showa Sangyo Co., Ltd.	04-12-91 - 03-31-93
	Basic research on multiplication factor of liver cells that come from spleen	Maekawa Seisaku Co., Taisho Pharmaceutical Co.	02-18-92 - 03-31-93
	Research on mechanism by which blood vessels are formed and the differentiation of endovascular cells	Aichi Medical University	11-19-91 - 03-31-93
	Research to improve functionality of physiologically active substances using synthetic polymers	Polar Chemical Industries Co., Ltd., Sankyo Corp.	01-01-93 - 03-31-93
	Research concerned with R&D on building an integrated genetic information data base and the use thereof	Biotechnology Development Research Cooperative	08-01-92 - 03-31-93
	Research on new materials for channeling blood based on plasma agglutination	Kawazumi Chemical Industries Co., Ltd.	06-01-92 - 03-31-93
	Research concerned with R&D on applications of human sensory measurements	Engineering Center for Human Activities	10-09-92 - 03-31-93
Electro-technical Laboratory	Research on basic SOR technology	Sortech Co., Ltd.	09-01-86 - 03-31-93
	Research on usability of fractional data in electronic dictionaries	Electronic Dictionary, Research Institute of Japan	10-14-86 - 03-31-93
	Research on methods of adapting theoretical programming environment to creation of intelligent software	Next-Generation Computer Technology Dev. Org.	02-12-88 - 03-31-93
	Research to elucidate the electronic structure of high-temperature superconductors used in supercomputers	Int'l. Superconductivity Technology Center	10-01-88 - 03-31-93
	Research on methods of analyzing/assessing material with high-intensity low-speed positive electron beam	University of Tsukuba	07-06-89 - 03-31-93
	Research on stereovision applications for industrial robots	Sanyo Denki Co., Ltd.	10-11-89 - 03-31-93
	Research to develop and evaluate functional devices	University of Tsukuba	02-20-90 - 03-31-93
	Research on SQUID micromagnetism measurement system	Superconductor Sensor Research Institute	06-08-90 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
Electro-technical Laboratory (continued)	Research on gaseous thin film formation process	Tokyo University Engineering Department	06-14-90 - 03-31-93
	Research on mechanism by which silicon film is formed using plasma	Tokyo Institute of Technology	06-14-90 - 03-31-93
	Research on marine fiber-optic distribution sensor technology	Sumitomo Electric Industries, Ltd.	07-05-90 - 03-31-93
	Research on growth process of film elements	University of Tsukuba	07-25-90 - 03-31-93
	Research on dynamic characteristics of magnetic lattices in new superconducting materials	Chino Corporation	08-20-90 - 06-30-92
	Computer simulation of solid phase epitaxial growth and calculation of electronic structure of SiO ₂ /Si interface	University of Tsukuba	11-06-90 - 03-31-93
	Development of molecule-dispersed functional organic photomaterials and elucidation of mechanism by which non-linear phenomena appear	Dainichi Seika Colour and Chemicals Mfg. Co., Ltd.	04-15-91 - 03-31-93
	R&D to develop new structural models for software	Information Processing Association (IPA)	04-19-91 - 03-31-93
	Development of magnetically shielded superconducting galvanometer	Central Research Institute of Electric Power Industry	05-01-91 - 03-31-93
	Development of innovative machining processes through short-term use of micro-gravity environments	Japan Space Environment Usage Promotion Center	05-14-91 - 03-31-93
	Research on radiation damage to silicon carbide layered structures (IV)	Japan Atomic Energy Research Institute	05-18-92 - 03-31-93
	Research to elucidate structure of radiation defects in CaAs	Hosei University	07-19-91 - 03-31-93
	Research to assess precision of standard secondary voltage generators based on Josephson-effect voltage standard	Japan Electric Instrument Inspection Station, Advantest Co., Ltd., Yokogawa Electric Corp., Yokogawa-Hewlett Packard, Furuguchi Co., Ltd.	09-02-91 - 03-31-93
	Fabrication and microscopic evaluation of semiconductor materials	Hiroshima University Engineering Department	09-13-91 - 03-31-93
	Research on methods of analyzing aerosol components	Science University of Tokyo	10-01-91 - 03-31-93
	Spectroscopic crystal processing and ultra-high-sensitive measure of film impurities	NEC Corporation	11-15-91 - 03-31-93
	Development of III-V family compound semiconductor LED materials by ion injection	Nippon Mining Co., Ltd.	11-30-91 - 03-31-93
	Photoelectric separation of ions by synchrotron irradiation	Institute of Physical and Chemical Research	01-10-92 - 03-31-93
	Dynamics of interactions caused by intense photoexcitation of highly concentrated dispersed molecular aggregate systems	Research Corporation of Japan (JRC)	02-03-92 - 03-31-93
	Research on integrated model for building next-generation production system	Toyo Engineering Corporation	09-01-92 - 03-31-93
	Formation of semiconductor film by undulating irradiation	Tsukuba University	05-13-92 - 03-31-93
	Transient responses by microscopic ion beam in semiconductor PN junctions	Japan Atomic Energy Research Institute	05-18-92 - 03-31-93
	Photochemical reactions using helical undulator	Himeji Institute of Technology	06-01-92 - 06-30-92
	Research on method of bonding milliwave and Josephson junction arrays	Advantest Sendai Research Institute	05-01-92 - 03-31-93
	R&D on method of treating graphite surfaces by plasma CVD method	Japan Atomic Energy Research Institute	07-01-92 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
Electro-technical Laboratory (continued)	Research to evaluate the surfaces and interfaces of functional devices	Telecommunication Research Institute, Tohoku U	07-10-92 - 03-31-93
	Research on highly sensitive sub-milliwave receiver which uses superconductivity	Kisarazu Industrial Technology Institute	07-10-92 - 03-31-93
	Electronic structure of organic superconductors	National Research Institute for Metals	09-01-92 - 03-31-93
	Research on visualizing fluid phenomena that accompany interfacial phenomena	Toshiba Corporation	09-08-92 - 03-31-93
	Development of UV spare ionized high-voltage XeCl laser	Mitsubishi Heavy Industries Co., Ltd.	10-01-92 - 03-31-93
	Basic research on real world computing	New Information Processing Development Organization	10-01-92 - 03-31-93
	Research on parallel object directional signaling system for parallel computers	Tokyo University, Science Dept.	11-02-92 - 03-31-93
	Research to assess object directional distributed processing environment	Data Processing Promotion Council	12-07-92 - 03-31-93
	Research on object directional distributed processing environment	Mitsubishi Research Inst., Sharp Corp., Sharp Business Computer Software, Toyo Information Systems, Nihon Unisys, Fuji-Xerox Information Systems	11-02-92 - 03-31-93
	Research on basic high-temperature device technology	Kanagawa Advanced Technology Support Center	12-25-92 - 03-31-93
	Research on calibrating VHF/UHF-band and microwave-band antennae (1 GHz - 18GHz)	EMC Center	01-14-93 - 03-31-93
	Research on temperature coefficient of ultra-precise low-resistance wiring standard and the yearly fluctuations and improvements thereof	Kyoshin Advantech Co., Ltd.	01-21-93 - 03-31-93
	R&D on executable formula-specific signaling system CaFeOBJ	Data Processing Promotion Council	02-01-93 - 03-31-93
	Research to express functions of heart by non-invasive measurement	Daikin Industries Co., Ltd.	03-01-93 - 03-31-93
National Institute for Resources and the Environment	Research to upgrade control blasting and demolition methods	Hazumagumi, Ltd., Hatori Kensetsu Co., Ltd., Nippon Kayaku Co., Ltd., Nippon Steel Corp., Mechanical and Electronic Inspection Ctr.	10-02-89 - 03-31-93
	Research on behavior and stabilization of large-scale base rock wall surfaces	Geol. Survey of Japan, Nishimatsu Construction, Ohbayashi, Hazumagumi, Mitsui Construction Co., Takekatsu Construction Co., Ryoko Mining Co., Chichibu Cement Co.	07-01-92 - 03-31-93
	Research on erosion of concrete by seawater	Mitsui Mining and Smelting Co., Ltd.	05-29-89 - 03-31-93
	Research on removal of less concentrated nitrous oxides	Fuji Electric Co., Ltd.	07-17-89 - 03-31-93
	Research to develop means of separating heterocompounds in liquefied coal oil and the applications thereof	Nippon Steel Chemical Co., Ltd., Kobe Steel, Ltd.	07-20-89 - 03-31-93
	Research to develop high value-added process for serpentinite	Toho Oribin Industry Co., Ltd.	04-04-90 - 03-31-93
	Research on synthesis and carbonization of polyimides by vapor deposition polymerization method	Ulvac Corporation	04-04-90 - 03-31-93
	Research to develop spherical hydraulic crushing technique	Central Research Institute of Electric Power Industry, Abiko Research Institute	06-11-90 - 03-31-93
	Basic research on long-term rock transformation and fracturing	Kyushu U, Environmental Systems Engineering Research Center	11-01-90 - 03-31-93
	Research to develop device which uses plasma in decomposition of freon	Tokyo U Engineering Dept., Tokyo Electric Power Co., JEOL, Nippon Steel Corp., Nittetsu Tech. Info. Center	11-01-90 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
National Institute for Resources and the Environment (continued)	Development of advanced hydrogen catalysts	National Chemical Lab For Industry (NCLI), Research Institute of Innovative Technologies for the Earth	12-12-90 - 03-31-93
	Research on methods of thermochemically treating organic wastes	Ebara Corporation	04-12-91 - 03-31-93
	Research on methods of treating nitrous oxides	Riken Corporation	04-22-91 - 06-30-92
	Research to generate elastic waves by precision blasting	Taisei Corporation	08-05-91 - 03-31-93
	Basic research on mechanical motion control system	Muroran Institute of Technology, Eng. Dept.	10-01-91 - 03-31-93
	Basic research on mechanical motion control system	Tohoku U, Engineering Dept.	10-01-91 - 03-31-93
	Basic research on abrasive mixing mechanism in very high-pressure waterjet nozzles	Yamagata U, Engineering Dept.	04-10-92 - 03-31-93
	Basic research on separation and refining of organic compounds by the pressure crystallization method	Tohoku U, Reactive Chemistry Dept.	04-10-92 - 03-31-93
	Basic research on analytic algorithm for analyzing concentration of greenhouse gases	Central Research Institute of Electric Power Industry, Komae Research Institute	05-27-92 - 03-31-93
	Research to study catalytic reaction between paraffin and CO ₂	Chiba Institute of Technology	07-01-92 - 03-31-93
	Research to study atmospheric chemical reactions of organic halide compounds	Asahi Chemical Industry Co., Ltd.	07-20-92 - 03-31-93
	Research on CO ₂ gas fixing and oil conversion by seaweeds	Tokyo Inst. of Technology, Basic Engineering Dept.	07-28-92 - 03-31-93
	Research on ways of analyzing composition of microbiological groups in active pollutants	Chemical Products Research Association	08-01-92 - 03-31-93
	Research on activation of brown coal by preprocessing	Nippon Kattan Ekika Co., Ltd.	08-01-92 - 03-31-93
	R&D on new refrigerant for compression-type heat pump	Research Institute of Innovative Technologies for the Earth	08-02-92 - 03-31-93
	Research to develop non-combustion and flameproofing technologies	Coal Mining Research Center	09-01-92 - 06-30-93
	Research on method of evaluating changes in physical properties that come with drilling	Power Reactor and Nuclear Fuel Development Corp.	09-01-92 - 03-31-93
	Analysis of data from new processes having to do with surveys on development of coal hydrogasification technology	Mitsubishi Heavy Industries Co., Ltd.	12-10-92 - 03-31-93
Government Industrial Research Institute, Hokkaido	Evaluation of process by which film is formed on amorphous chalcogenite semiconductor	Hokkaido U, Engineering Dept.	04-09-92 - 03-31-93
	Research on medical diagnosis system involving information transmission	Sapporo Meiwa Hospital, Rakuno Gakuen University, Shiwaku Co., Ltd.	04-09-92 - 03-31-93
	Research on heat pumps for colder regions	Maekawa Manufacturing Co., Ltd.	04-09-92 - 03-31-93
	Pilot study of coal preprocessing	Coal Mining Research Center, Japan	04-09-92 - 03-31-93
	Research to develop highly selective metallic element separation materials by upgrading molecule recognition function	Government Industrial Research Institute, Tohoku, Mitsubishi Chemical Industries, Ltd., Hitachi Chemical Co., Ltd., Nippon Sosui Co., Ltd., Sara Kogyo Co., Ltd., Asaka Riken Kogyo Co., Ltd.	04-09-92 - 03-31-93
	Perfecting solid fermentation farm by-product feed technology	Hokkaido Takigawa Livestock Research Lab	04-09-92 - 03-31-93
	Research on ways to evaluate durability of snow tires	Yokohama Rubber Co., Ltd.	05-06-92 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
Government Industrial Research Institute, Hokkaido (continued)	Research to generate new particle-dispersed composite alloys in microgravity environment	Yamatake-Honeywell Co., Japan Steel Works Co.	07-01-92 - 03-31-93
	Study of relationship between nuclear reactivity and raw material properties, and coal and char reactivity	Hitachi, Ltd., Babcock Hitachi, Ltd.	08-03-92 - 03-31-93
	Advanced uses of bioresources in colder regions	North Kawakami Cooperative Starch Plant; Okhotsk Cooperative Starch Factory; Snow Brand Milk Products Co., Sapporo Research Institute; Mitsui Toatsu Chemicals, Hokkaido Plant; Hokkaido Forestry Research Lab; Hokkaido Livestock Research Lab; Aomori Pref. Industrial Technology Center; Tamazukuri Co.; Hokuren Agricultural Cooperative; Hokko Chemical Industries Co.; Hayasaka Riko Co.	10-01-92 - 03-31-93
	Research to develop mild gas manufacturing system that uses peat	Engineering Advancement Association of Japan	10-01-92 - 03-31-93
	Research on the production/reduction of N ₂ O from fluidized bed combustors	Center for Coal Utilization, Japan	11-24-92 - 03-31-93
	Evaluating the gasification characteristics of hydrofined char	Mitsubishi Heavy Industries, Ltd.	12-16-92 - 03-31-93
Government Industrial Research Institute, Kyushu	Research on synthesis and functionality of inorganic composite polymers	Mitsubishi Gas Chemical Co., Ltd., Kohpu Chemical Co., Ltd., Teika Co., Ltd.	07-01-90 - 03-31-93
	Research to develop new pottery clay using low-fired pottery stones as raw material	Saga Industrial Research Lab, Nagasaki Industrial Ceramics Technology Center, Kumamoto Industrial Technology Center, Kagoshima Industrial Technology Center, Amakusa Pottery Cooperative, Oita Pottery Cooperative	07-10-90 - 03-31-93
	R&D on technologies pertaining to fine element materials of coal	Asuku Co., Ltd., Aso Cement Co., Ltd., Ueda Lime Manufacturing Co., Ltd., Okutama Industries, Ltd., Onoda Cement Co., Ltd., Kawai Lime, Ltd., Kurimoto Steel Works, Ltd., Sumitomo Cement Co., Ltd., Chichibu Lime, Ltd., Toyo Denka Kogyo, Ltd., Nitchin Co., Ltd., Nippon Kakoh Seishi K.K., Fukuoka Industrial Technology Center, Saga Industrial Technology Center, Kumamoto Industrial Technology Center, Oita Industrial Research Institute, Okinawa Industrial Research Institute, Okayama Industrial Technology Center	10-13-88 - 03-31-93
Government Industrial Research Institute, Shikoku	R&D on recycling system for composite materials 1—Research on dismantling, crushing, and classifying FRP waste	Kagawa Prefecture, Shin-Kochi Heavy Industries, Ltd., Shikoku Kiki Co. Ltd., Shikoku Passenger Train Co., Ltd., Nissin Kikai Co., Ltd., Hashimoto Special Industries Co., Ltd., Mitsui Engineering and Shipbuilding Co., Ltd., Tatemitsu Industries, Ltd.	12-01-88 - 03-31-93
	R&D on recycling system for composite materials 2—Research on dismantling, crushing, and classifying FRP waste	Nihon Spindle Manufacturing Co., Ltd.	12-01-88 - 03-31-93
	R&D on recycling system for composite materials 3—Research on recycling FRP waste (direct uses)	Ehime Prefecture, Kochi Prefecture, Okura Industries, Ltd., Daiki Co., Ltd., Marusen Kagaku Co., Ltd.	12-01-88 - 03-31-93
	R&D on recycling system for composite materials 4—Research on recycling FRP waste (disintegration uses)	Kochi Prefecture, Tokushima Prefecture, Toyo Denka Kogyo Co., Ltd., Toyo Engineering Works, Ltd., Shin-Kochi Industries, Ltd.	12-01-88 - 03-31-93
	Research on development of acidic polysaccharide fiber functions and applications in electronic and acoustic materials	Mogami Denki Co., Ltd., Pioneer Electronic Corporation	08-04-88 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
Government Industrial Research Institute, Shikoku (continued)	Research on development of biodegradable sheets 1—Developing technology for manufacturing fiber sheet molding	Kanai Juyo Kogyo Co., Ltd.	08-04-88 - 03-31-93
	Research on development of biodegradable sheets 2—Development of technology for manufacturing industrial molding	Oishi Sangyo Co., Ltd., Izeiki Noki Co. Ltd.	05-29-89 - 03-31-93
	Research on development of biodegradable sheets 3—Development of technology for manufacturing porous molding	Nishikawa Rubber Industries, Ltd.	05-29-89 - 03-31-93
	Research on development of biodegradable sheets 4—Development of technology for manufacturing industrial sheets	Okura Industries, Ltd.	05-29-89 - 03-31-93
	Research on development of biodegradable sheets 5—Development of technology for manufacturing industrial sheets	Aisero Kagaku Co., Ltd.	05-29-89 - 03-31-93
	Research on inorganic phosphorous textiles	Toyo Denka Kogyo Co., Ltd.	06-11-90 - 03-31-93
	Research on applications for insoluble alginate fiber that contains bacterial-resistant zeolite	Takamitsu Co., Ltd.	
	Research on development of more advanced flame-coating process	Tokushima Prefecture, Kagawa Prefecture, Kochi Prefecture, Okayama Prefecture	06-14-90 - 03-31-93
	Research on ion and laser beam based metal finishing	Tokushima University, Industrial Junior College, Tokushima University Engineering Department	05-17-91 - 03-31-93
	Research on use of laser beams to obtain high functionality in powder-based surfaces	Shin-Niihama Industrial High School and College, Sumitomo Heavy Industries Forging Co., Ltd.	09-05-91 - 03-31-93
	Research on replacement materials for tortoise shell based on development of natural polymer compounds	Tortoise shell Association of Japan	01-27-92 - 03-31-93
	Research on beam damping technology for vehicles that work in high places	Aichi Corporation	04-15-92 - 03-31-93
	Applied research on use of agricultural and marine waste products as ecomaterials used in food distribution	Kagawa Pref., Okura Industrial Co., Ltd.	08-17-92 - 03-31-93
	Research on development of battery	Otsuka Pharmaceutical Co., Ltd.	09-10-92 - 03-31-93
	Research on whisker-reinforced aluminum composites	Kagawa University, Okayama Prefecture, Kamadatoshi, Co. Ltd., Shikoku Kasei Co., Ltd., Tadano Co., Ltd., Toyo Denka Industries, Ltd.	02-15-93 - 03-31-93
Government Industrial Research Institute, Tohoku	Research on method of comprehensively evaluating composite structures based on internal inspection system	Aomori Pref., Iwate Pref., Akita Pref., Miyagi Pref., Yamagata Pref., Fukushima Pref., Nitto Chemical Industry Co., Ltd., Ben Iwate Kojio, Ltd., Sugiura Manufacturing Co., Ltd., Tohoku Ricoh Co., Ltd., Nippon Ceratech Co., Ltd., Tohoku Special Steel Co., Ltd., Asaka Riken Industries, Ltd., Kokken Denshi Co., Ltd., Hitachi Construction Machinery Co., Ltd., Tokimekku Co., Ltd., Honda Kin-zoku Gijutsu, Ltd., Komatsu Ltd., Nippon Emerson Co., Ltd., Tohoku University, Yamagata University	09-10-90 - 03-31-93
	Research on manufacturing technology for swollen silicates and the uses thereof	Kohpu Chemical Co., Ltd.	04-01-91 - 03-31-93

1992 Joint Research Projects (Continued)

AIST Lab	Research Project	Research Partner	Term
Government Industrial Research Institute, Tohoku (continued)	Research on ways of analyzing the flow of non-transparent composite thermoplastic resin products by ultrasonic imaging	Hitachi Chemical Model Co., Ltd.	04-01-91 - 03-31-93
	Research to perfect method of manufacturing hectorite and stevensite	Kunimine Industries, Ltd.	08-01-91 - 03-31-93
	Research on effects of gravity on material manufacturing processes with gaseous chemical reactions	Mitsubishi Research Institute	01-10-92 - 03-31-93
	Research on residual stress in partially-stable zirconia and stainless steel zygotes	Tohoku University Engineering Department	02-01-92 - 03-31-93
	Research to develop flow rate meter for sealed water conduits	Sanden Kogyo Co., Ltd.	02-20-92 - 03-31-93
	Research to assess status of various types of joints by an ultrasonic imaging device	Mitsubishi Aluminum Co., Ltd.	04-01-92 - 03-31-93
	Research to develop and manufacture functional inorganic composite adsorbents	Nitto Funko Co., Ltd.	04-01-92 - 03-31-93
	Research on application of local natural resources in biotechnology	Akita Prefecture	04-01-92 - 03-31-93
	Research on coating technology	Fushimi Seiyaku Co., Ltd.	07-01-92 - 03-31-93
	Research on ion adsorption and swelling mechanisms of inorganic compounds	Power Reactor and Nuclear Fuel Development Corporation	04-01-92 - 03-31-93
Government Industrial Research Institute, Chugoku	Technology for evaluating the design process for precision molding of free curved surfaces	Tottori Industrial Research Laboratory, Tottori Industrial Technology Center, Okayama Industrial Technology Center, Hiroshima Industrial Technology Center, West, Hiroshima Industrial Technology Center, East, Yamaguchi Industrial Technology Center, Mitsuyo Co., Chugoku Industries, Ltd., Nippon System Design Co., Interface Co., Sanei Technologies Co., Aimekkusu Co., Mazda Motor Corporation, Ishikawajima-Harima Heavy Industries Co., Mitsubishi Motors Corporation, Metasoft-Fuji Co., Japan Steel Works, Ltd., System Instrumentation Co., Ltd., Nissin Steel Co., Ltd., Sharp Corp., Sakurai Kikai Co., Kasen Nozzle Manufacturing Co., Ltd., IPD Co., Ltd., Sanin Microcomputer Center, MIT System Development Co., Sankyo Seiko Co., Hirotech Co., Nippon Press Co., Katayama Industries, Ltd., Hiruta Industries, Ltd., Sanyo Brake Co., Kinki University	04-01-92 - 03-31-93
	Research on plan generation for the purpose of robot control	Hiroshima Industrial Technology Center, West, Hiroshima Industrial Technology Center, East, Kinki University Engineering Dept., Maritime Safety Academy, Ten Pearl Co., Ltd., Sanzo Co., Ltd.	04-01-92 - 03-31-93

Public-Private Joint Research

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31 Oct 93 pp 492-495

[Text]

3. Public-Private Sector Joint Research Programs

The technical development of private companies in Japan is shifting from the traditional means in which companies import technologies from abroad to a more modern approach whereby companies base their growth on applied research and practical research oriented toward commercialization and industrialization. However, when we consider the current technological level and development potential of Japan, it is obvious that a stronger emphasis must be placed on more fundamental research and development.

Research and development in basic and foundational areas carries with it major technical and economic risks, so it is hard to say whether such R&D will be fully implemented by private companies in Japan.

On the other hand, since the AIST laboratories were established we have seen a steady growth of practical results in the area of foundational research, so the research potential is extremely high when observed from that perspective.

In order to more effectively promote foundational research in Japan, AIST initiated the Private-Public Sector Joint Research Program in 1985 with the specific aim of implementing joint research that would take maximum advantage of the foundational research potential in AIST laboratories and be organically linked with the human and financial potential of private industry.

In the conventional joint research system, government research laboratories would promote research and development through the private sector, but that system was equivalent to allocating research as there was no exchange of research or shared use of equipment. It would be an overstatement to say that this system was successful, particularly since there were no budgetary actions taken by the government. The new joint research program, however, enables centralized joint research by establishing organic links between the public and private sector. This research program includes the joint use of equipment owned by AIST laboratories as well as equipment owned by private industry.

1. Priority Research Projects

These are research projects in which public interest is thought to be particularly high. These topics are concerned with foundational research essential to building an industrial base and with joint research between private companies and AIST laboratories in high priority areas.

2. Research Implementation

The research will be carried out at AIST laboratories or at private corporations depending on the needs at the time.

(2) Use of research equipment

In order to produce effective joint research based on organic links between the public and private sector, AIST laboratories will accept private researchers (civilians), allow private research equipment to be used, and allow private researchers to use research equipment owned by the AIST research laboratories free of charge.

In addition, the government will send researchers to private companies as the need arises (official business visits).

(3) Research and development funding

Personnel costs will be handled separately. In terms of the equipment needed for research, there will be no charge to either party for the use of each other's equipment. Payment for new equipment, supplies, and utilities will be determined according to the respective share of research being implemented by each party.

(4) Contributing equipment

It will also be possible for privately owned companies which are supplying their own equipment to the AIST laboratory for the purpose of joint research to donate that equipment to the AIST research laboratory if it is thought to be too expensive to remove the equipment once the joint research has been completed, or if the equipment was designed exclusively for a particular joint research project, or if it was built so that it could continue to be used in the future by the AIST laboratory.

The research findings made during joint research will become joint public-private property.

FY93 Budget - ¥250 million

Joint Public-Private Research Projects (July 1, 1993)

Research	AIST Lab	Term	Partner	Description
Develop highly selective isolating agent for metallic elements based on advanced molecule recognition function	GIRI, Toh, GIRI, Hok	1991 - 1994	Mitsubishi Chemical Industries, Ltd., Hitachi Chemical Co., Ltd., Rasa Industries, Ltd., Nippon Rensui Co., Ltd., Asaka Riken Co., Ltd.	In advanced industries where development of new materials plays a central role, it is essential that there be a stable supply of highly pure rare metals for use as raw materials, and likewise essential, there should be a more sophisticated method for separating metals based on composition analysis in order to conduct process and quality management of new materials. This research will focus on creating new materials and reagents having the ability to recognize metal ions and metal complexes by making compounds of chain-shaped reagents and large-molecule organic polymers that react selectively with metal ions such as rhodium, niobium, and rare earth elements. The knowledge gained will be used to develop a method for isolating and recovering resource metals, i.e. rare metals, and a method for isolating and analyzing the purity of ultra-minute quantities.
Develop advanced functions in physiologically active substances through use of synthetic polymers	NIBH	1991 - 1993	Sankyo Co., Ltd., Bioscience Research Institute, Polar Chemical Industries, Ltd., New Pharmaceutical Research Institute	The rapid growth of biotechnology in recent years has led to the production of large amounts of physiologically active substances such as interferon, growth hormones, and cancer-resisting agents, but many cannot be used because their effectiveness has not been fully documented and some have proven to be toxic. There is thus a demand for an applied technology with regard to these substances. The aim of this research will be to concentrate on substances that appear to be effective against cancer and develop a technology for making the physiologically active substances more functional through the use of synthetic polymers.
Invent new alloys with evenly distributed particle matter in microgravity environment	GIRI, Hok	1992 - 1994	Yamatake-Honeywell Co., Ltd., Japan Steel Works, Ltd.	The aim of this research is to create a whole martensite crystal that exhibits excellent wear, corrosion, and heat resistance by melting powdered metal in a microgravity environment and producing an iron alloy with an even distribution of particulate throughout. Therefore, using a drop test facility in which a temporary microgravity environment can be produced, this research will focus on developing an effective method for fabricating this material. The structure of the new composite material will then be analyzed and its properties evaluated.
Advanced three-dimensional measurement methods for large structures	NRLM	1992 - 1994	Tokyo Keiso Co., Ltd., Nikon Corp., Tadano Corp., Idec Izumi Corp.	In order to perfect an advanced three-dimensional measurement and evaluation technology for large structures such as tanks and cranes, this research will focus on developing a method for taking long-distant measurements by laser, a laser tracking method for optical measurements of three-dimensional positions, developing a use for optic-fiber technology for anti-explosion purposes, a method for evaluating quantities by means of measuring pressure, and a method for compensating for the pneumatic refraction factor.
Evaluate behavior and stability of large base rock wall surfaces	GSJ, NIRE	1992 - 1996	Nishimatsu Construction Co., Ltd., Mitsui Construction Co., Ltd., Hazuma-Gumi, Ltd.	In order to prevent breakup and disintegration of large base rock wall surfaces in strip mines and underground tunnels, this research will focus on the development of a technology for elucidating the mechanism at work, devising a means for detecting it beforehand, and then incorporating that knowledge into safety operations. To accomplish that goal, this research will try to elucidate and evaluate the specific behavior of ground water in discontinuous surfaces within base rock.
Research on mechanism by which bubbles are generated in the glass fusion process	GIRI, Osa	1993 - 1996	Asahi Glass Co., Ltd., Central Glass Co., Ltd., Nippon Sheet Glass Co., Ltd., Nippon Electric Glass Co., Ltd., Toyo Glass Co., Ltd., HOYA Corp., and three others	In order to resolve the problem of bubbles in the glass fusion process, this research will attempt to perfect a technology which analyzes microbubbles, and with that will conduct scientific studies on bubbling mechanisms which will include the gas component dissolving and bubbling mechanism, the mechanism by which glass is refined by a clarifying agent, elucidation of the rebubbling phenomenon (reboil) caused by oxidation and reduction, and bubbling caused by contact with the furnace.

Joint Public-Private Research Projects (July 1, 1993) (Continued)

Research	AIST Lab	Term	Partner	Description
Perfect mitigation technology to control ocean environment	GIRI, Chu	1993 - 1996	Chugoku Electric Power Co., Ltd., Taisei Corp., Penta-Ocean Construction Co., Ltd., Bridgestone Corp.	Based on the results of R&D conducted by this laboratory on flow-duration control as a leading technology that both mitigates and protects the natural environment from the effects that large-scale developments have on the ocean environment, this project will include R&D on a flow-duration control structure having a commercial function and research on effective adaptable configurations.
Material processing using ultra-high-speed high-density plasma jets	NIMC	1993 - 1996	National Research Institute for Metals, Ishikawajima-Harima Heavy Industries Co., Ltd., Kobe Steel, Ltd., Japan Steel Works, Ltd., Mitsubishi Heavy Industries, Ltd., Mitsubishi Materials Corp.	The technology of plasma flamecoating, which is now used commercially, is running up against technical limitations in terms of the interparticle binding forces in flamecoated film, the existence of air pockets, and bonding capability with materials, so it has become an urgent matter that new and innovative technologies be developed that will enable even higher quality film to be created, thus this research will attempt to prototype new materials and perfect a generation/control technology for the ultra-high-speed high-density plasma jets used at this laboratory and a high-energy flamecoating technology for private industry.
Upgrading the functionality and controlling in vivo production of ribozymes	NIBH	1993 - 1995	Nippon Kasei Chemical Co., Ltd., Hisamitsu Pharmaceutical Co., Ltd., Nagase Sangyo Co., Ltd., Applied Biosystems Japan Co., Ltd.	This research will be about developing a method for increasing the activation energy and stability of ribozymes whose activity is less than protein enzymes. The ribozyme is used to disconnect and deactivate the genome of RNA virus such as AIDS. R&D will also be conducted on bringing about efficient in vivo production of ribozymes in the future.
Synthesis and functionality of inorganic layered polymers	GIRI, Kyu	1990-1993	Mitsubishi Gas Chemical Co., Ltd., Koppu Chemical Co., Ltd.	This research will focus on the synthesis of new innovative fluoromica having high-frequency and optical properties by the conventional method and by non-conventional mechanism, and will attempt to elucidate the electrical and optical properties therein. This project will focus on the development of a continuous production system for fluoromica, as well as R&D on high-tech electronic materials, special light-sensitive pigments, and non-combustible sheets.
Development of near net shape molds by casted metals	GIRI, Nag	1990-1993	Daido Steel Co., Ltd., Nissan Chemical Industries, Ltd., Fuji Electric Co., Ltd.	By developing a method for molding near net shapes by casting hard metals such as titanium and titanium-aluminum, this research will focus on (1) developing a high-precision mold that will not react with those materials, and (2) injection of pure solvents into a vacuum or inert gas atmosphere, (3) producing materials and systems that can supply manufactured goods to advanced industries.

AIST Laboratories Carrying Out Technical Guidance

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5. Technical Guidance

As was stated in Chapter 1, the research laboratories affiliated with AIST share basic research with each other. One of the responsibilities of AIST is to widely disseminate the technology and know-how that has been accumulating over many years.

In the meantime, AIST research laboratories have been receiving strong demands for technical assistance and consultation regarding fundamental and basic research.

Therefore, in 1957, AIST decided to open a technical assistance center in its main headquarters. Later, it opened technical assistance centers at affiliated research

organizations. Those parties desiring technical assistance should contact a technical assistance center (or technical exchange and promotion center) at any of the AIST research laboratories.

In accordance with Article 2 of the Regulations Governing Inventions Made with AIST Technical Assistance, which was approved by the Diet on February 25, 1972, each research laboratory must exchange written confirmations with the organizations with whom it is rendering assistance concerning how inventions pertaining to said technical assistance will be administered given the possibility of an invention.

AIST has established what are called liaison committees to facilitate research exchanges, help with staff training, and build cooperation with public examination and technology centers. These were first formed in 1954 in order to raise the technological level of local industries, particularly growth industries, and to place more emphasis on R&D in local public research institutions.

1992 Technical Assistance and Consultation

Year	FY88		FY89	
	Assist	Advise	Assist	Advise
Research Laboratory				
National Research Laboratory of Metrology	21	1089	24	374
Mechanical Engineering Laboratory	75	564	80	480
National Chemical Laboratory for Industry	114	1149	92	1024
Government Industrial Research Institute, Osaka	126	2890	103	2168
Government Industrial Research Institute, Nagoya	147	1671	134	1240
Fermentation Research Institute	62	1352	73	1391
Research Institute for Polymers and Textiles	56	329	43	356
Geological Survey of Japan	8	1101	54	1418
Electrotechnical Laboratory	118	751	172	700
Industrial Products Research Institute	45	255	40	208
Research Institute for Environment and Natural Resources	46	745	38	732
Government Industrial Development Laboratory, Hokkaido	35	324	39	336
Government Industrial Research Institute, Kyushu	26	935	29	805
Government Industrial Research Institute, Shikoku	16	460	16	405
Government Industrial Research Institute, Tohoku	22	113	17	100
Government Industrial Research Institute, Chugoku	17	178	9	112
Total	934	13,906	963	11,849

Kohsetsushi Laboratories Profiled

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List of Public Examination and Technology Centers—Part One

District	No.	Local Affiliate	Organization
Hokkaido (11)	101	Hokkaido Pref.	Hokkaido Pref. Industrial Research Institute
	102	Hokkaido Pref.	Hokkaido Pref. Forestry Research Laboratory
	103	Hokkaido Pref.	Hokkaido Pref. Underground Resources Research Institute
	104	Hokkaido Pref.	Hokkaido Pref. Cold Region Urban Research Institute
	105	Hokkaido Pref.	Hokkaido Environmental Science Research Center
	106	Hokkaido Pref.	Hokkaido Pref. Industrial Technology Center
	107	Asahikawa City	Asahikawa Industrial Science and Technology Center
	108	Asahikawa City	Asahikawa Industrial Arts Center
	109	Kitami City	Kitami Industrial Science and Technology Center
	110	Obihira City	Obihira Industrial Technology Center
	111	Hokkaido	Hokkaido Food Processing Center

List of Public Examination and Technology Centers—Part One (Continued)

District	No.	Local Affiliate	Organization
Tohoku (14)	201	Aomori Pref.	Aomori Industrial Technology Center
	202	Aomori Pref.	Aomori Industrial Research Institute
		Aomori Pref.	Aomori Industrial Research Institute, Aomori Woodworking Institute
	203	Aomori Pref.	Aomori Machinery and Metals Research Institute
	204	Aomori Pref.	Aomori Marine Products Processing Research Institute
	205	Iwate Pref.	Iwate Industrial Research Institute
	206	Iwate Pref.	Iwate Brewing and Foodstuff Research Laboratory
	207	Iwate Pref.	Iwate Fisheries Research Laboratory
	208	Akita Pref.	Akita Industrial Technology Center
	209	Akita Pref.	Akita Brewing Research Laboratory
	210	Akita Pref.	Akita Environmental Technology Center
	211	Inawashiro City	Inawashiro Technology Development Center
	212	Yamagata Pref.	Yamagata Industrial Research Institute
	213	Miyagi Pref.	Miyagi Industrial Research Institute
	214	Fukushima Pref.	Fukushima Pref. High-Tech Plaza
		Fukushima Pref.	Fukushima Pref. High-Tech Plaza, Fukushima Branch
		Fukushima Pref.	Fukushima Pref. High-Tech Plaza, Aizuwakamatsu Branch
		Fukushima Pref.	Fukushima Pref. High-Tech Plaza, Iwaki Branch
Kanto (48)	301	Ibaragi Pref.	Ibaragi Industrial Research Institute
	302	Tochigi Pref.	Tochigi Industrial Technology Center
	303	Tochigi Pref.	Tochigi Textile Research Laboratory
	304	Tochigi Pref.	Tochigi Center for Commerce and Industry
	305	Tochigi Pref.	Tochigi Tsumugi Textile Research Laboratory
	306	Tochigi Pref.	Tochigi Food Products Research Laboratory
	307	Tochigi Pref.	Tochigi Ceramics Research Institute
	308	Gunma Pref.	Gunma Industrial Research Institute
	309	Gunma Pref.	Gunma Textile Research Laboratory
	310	Gunma Pref.	Gunma Agricultural Processing Center
	311	Saitama Pref.	Saitama Mold and Machinery Research Laboratory
	312	Saitama Pref.	Saitama Textile Research Laboratory
	313	Saitama Pref.	Saitama Paper Manufacturing Research Laboratory
	314	Saitama Pref.	Saitama Food Products Research Laboratory
	315	Saitama Pref.	Saitama Industrial Technology Research Institute
	316	Saitama Pref.	Saitama Horticulture Research Laboratory
	317	Saitama Pref.	Saitama Environmental Pollution Center
	318	Chiba Pref.	Chiba Industrial Research Institute
	319	Chiba Pref.	Chiba Machinery and Metals Research Institute
	320	Chiba Pref.	Chiba Agricultural Research Laboratory
	321	Tokyo Metro	Tokyo Municipal Industrial Research Institute
	322	Tokyo Metro	Tokyo Municipal Textile Research Laboratory
	323	Tokyo Metro	Tokyo Municipal General Isotope Research Institute
	324	Tokyo Metro	Tokyo Municipal Food Products Technology Center
	325	Tokyo Metro	Tokyo Municipal Leather Technology Center

List of Public Examination and Technology Centers—Part One (Continued)

District	No.	Local Affiliate	Organization
Kanto (48) (continued)	326	Tokyo Metro	Tokyo Municipal Livestock Research Laboratory
	327	Kanagawa Pref.	Kanagawa Industrial Research Institute
	328	Kanagawa Pref.	Kanagawa Industrial Arts Institute
	329	Kanagawa Pref.	Kanagawa Textile Research Institute
	330	Kanagawa Pref.	Kanagawa Furniture Research Center
	331	Kanagawa Pref.	Kanagawa Agricultural General Research Institute
	332	Yokohama City	Yokohama Center for Small and Medium Enterprises
	333	Niigata Pref.	Niigata Industrial Technology Center
	334	Niigata Pref.	Niigata Food Products Research Laboratory
	335	Niigata Pref.	Niigata Brewing Research Laboratory
	336	Nagano Pref.	Nagano Information Technology Research Institute
	337	Nagano Pref.	Nagano Industrial Research Institute
	338	Nagano Pref.	Nagano Precision Machinery Research Institute
	339	Nagano Pref.	Nagano Food Products Research Institute
	340	Nagano Pref.	Nagano General Forestry Information Center
	341	Yamanashi Pref.	Yamanashi-Fuji Industrial Technology Center
	342	Yamanashi Pref.	Yamanashi Industrial Technology Center
	343	Shizuoka Pref.	Shizuoka Industrial Technology Center, Shizuoka
	344	Shizuoka Pref.	Shizuoka Industrial Technology Center, Hamamatsu
	345	Shizuoka Pref.	Shizuoka Industrial Technology Center, Fuji
	346	Shizuoka Pref.	Shizuoka Industrial Technology Center, Numazu
	347	Shizuoka Pref.	Shizuoka Design Center for Small-Medium Enterprises
	348	Shizuoka City	Shizuoka Center for New Industries

List of Public Examination and Technology Centers—Part Two

Organization	Address	Telephone
Hokkaido Pref. Industrial Research Institute	11-Block 19th Ave., Kita-ku, Sapporo City, T060	011(747)2211
Hokkaido Pref. Forestry Research Laboratory	1-10-174-7 Nishi Kagura, Asahikawa City, T071-01	0166(75)4233
Hokkaido Pref. Underground Resources Research Inst.	12-Block 19th Ave., Kita-ku, Sapporo City, T060	011(747)2211
Hokkaido Pref. Cold Region Urban Research Institute	1-3-36 4th Ave, Bldg. 24, Sapporo City, T063	011(621)4211
Hokkaido Environmental Science Research Center	12-Block 19th Ave., Kita-ku, Sapporo City, T060	011(747)2211
Hokkaido Pref. Industrial Technology Center	379 Kikyo-machi, Hakodate City, T041	0138(47)3615
Asahikawa Industrial Science and Technology Center	34-11 Hinode, E. Asahikawa-machi, Asahikawa, T078	0166(36)3111
Asahikawa Industrial Arts Institute	3-5-11 3rd Ave., Toyooka, Asahikawa City, T078	0166(32)1231
Kitami Industrial Science and Technology Center	1-4 Miwa, Kitami City, T090	0157(31)2705
Obihiro Industrial Technology Center	1-2-21 Kita, 22 Jo, Nishi Obihiro City T080-24	0155(37)3160
Hokkaido Food Processing Center	589-4 Midori-machi, Bunkyo-dai, Ebetsu City T069	011(387)4111
Aomori Industrial Technology Center	202-4 Oaza Yatsuyakuji Ashiya, Aomori City, T030-01	0177(39)9676
Aomori Industrial Research Institute	80 Fukuro-machi, Hirosaki City, T036	0172(32)1466
Aomori Industrial Research Institute, Aomori Woodworking Institute	202-4 Oaza Yatsuyakuji Ashiya, Aomori City, T030-01	0177(39)8551
Aomori Machinery and Metals Research Institute	4-7-8 Numadate, Hachinohe City, T031	0178(22)4336
Aomori Marine Products Processing Research Institute	2-10 Chikko-machi, Hachinohe City, T031	0178(33)1347
Iwate Industrial Research Institute	26 Tsushida, Morioka City, Iwate T020	0196(36)3640

List of Public Examination and Technology Centers—Part Two (Continued)

Organization	Address	Telephone
Iwate Brewing and Foodstuff Research Laboratory	26 Tsushida, Morioka City, Iwate T020	0196(35)4130
Iwate Fisheries Research Laboratory	1-4-21 Niihama-cho, Kamaishi City, T026	0193(24)2111
Akita Industrial Technology Center	4-11 Aza Sanuki Shinya-machi, Akita City, T010-16	0188(62)3414
Akita Brewing Research Laboratory	47 Aza Ebisugawara, Yatsushashi, Akita City, T010	0188(62)4285
Akita Environmental Technology Center	191-18 Aza Shimo, Yatsushashi, Akita City, T010	0188(63)1425
Inawashiro Technology Development Center	18-19 Aza Minami Nishiyama, Inawashiro City, T016-01	0185(52)5249
Yamagata Industrial Research Institute	683 Aza Kuruma-no-mae, Numaki, Yamagata City, T990	0236(44)3222
Miyagi Industrial Research Institute	8-7-20 Nagamachi, Taihaku-ku, Sendai City, T982	022(248)4386
Fukushima Pref. High-Tech Plaza	1-3 Shimoaza-Funokawa, Fukushima City, T960-21	0249(59)1911
Fukushima Pref. High-Tech Plaza, Fukushima Branch	7-2 Azayamakamidate, Katahira, Koriyama City T963-02	0245(93)1121
Fukushima Pref. High-Tech Plaza, Aizuwakamatsu Branch	651-1 Aza Muranishi, Aizuwakamatsu City, T965	0242(27)0834
Fukushima Pref. High-Tech Plaza, Iwaki Branch	23-32 Aza Kodosaku, Shimofunao-cho, Iwaki, T972	0246(44)1475
Ibaragi Industrial Research Institute	3781-1 Yato Nagaoka, Ibaragi-cho, Ibaragi, T311-31	0292(93)7212
Tochigi Industrial Technology Center	516-1 Shirokuwada, Kanuma City, T322	0289(62)5211
Tochigi Textile Research Laboratory	2870 Nishinomiya-cho, Ashikaga City, T326	0284(21)2138
Tochigi Center for Commerce and Industry	950 Tenjin-cho, Sano City, T327	0283(22)0733
Tochigi Tsumugi Textile Research Laboratory	2358 Fukura, Koyama City, T307-02	0285(49)0009
Tochigi Food Products Research Laboratory	508 Ichinosawa-cho, Utsunomiya City, T320	0286(48)5471
Tochigi Ceramics Research Institute	695 Mashiko, Mashiko-cho, Haga-gun, Tochigi, T321-42	02857(2)5221
Gunma Industrial Research Institute	190 Shimaba-cho, Maebashi City, T371	0272(51)4261
Gunma Textile Research Laboratory	5-46-1 Socho, Kiryu City, T376	0277(52)9950
Gunma Agricultural Processing Center	1085 Egi-cho, Maebashi City T371	0272(69)4171
Saitama Mold and Machinery Research Laboratory	1-1-56 Shibashita, Kawaguchi City T333	048(265)1311
Saitama Textile Research Laboratory	7-29 Muko-machi, Gyoda City T361	0485(55)2391
Saitama Paper Manufacturing Research Laboratory	226 Ogawa, Ogawa-cho, Hiki-gun, Saitama, T355-03	0493(72)0222
Saitama Food Products Research Laboratory	2-133 Suehiro, Kumagai City, 360	0485(21)0614
Saitama Industrial Technology Research Institute	3-10-1 Kizaki, Urawa City, T338	048(833)1511
Saitama Horticulture Research Laboratory	91 Rokumanbe, Kuki City, T346	0480(21)1113
Saitama Environmental Pollution Center	639-1 Kami Okubo, Urawa City, T338	048(853)6111
Chiba Industrial Research Institute	889 Kasori-cho, Chiba City, T264	043(231)4325
Chiba Machinery and Metals Research Institute	6-13-1 Tendai-cho, Chiba City, T263	043(252)2101
Chiba Agricultural Research Laboratory	808 Ozenno-cho, Chiba City, T266	043(291)0151, 043(291)5319
Tokyo Municipal Industrial Research Institute	3-13-10 Nishi-ga-oka Kita-ku, Tokyo, T115	03(3909)2151
Tokyo Municipal Textile Research Laboratory	3-19-1 Myoshin-cho, Hachioji City, T192	0426(42)7175
Tokyo Municipal General Isotope Research Institute	2-11-1 Fukazawa, Setagaya-ku, Tokyo, T158	03(3702)3111
Tokyo Municipal Food Products Technology Center	1-9 Sakuma-cho, Kanda, Chiyoda-ku, Tokyo, T101	03(5256)9251
Tokyo Municipal Leather Technology Center	3-3-14 E. Sumida, Sumida-ku, Tokyo, T131	03(3616)1671
Tokyo Municipal Livestock Research Laboratory	715 Shinmachi, Ome-shi, Tokyo, T198	0428(31)2171
Kanagawa Industrial Research Institute	3173 Showa-cho, Kanazawa-ku, Yokohama City, T236	045(771)1301
Kanagawa Industrial Arts Institute	1-7-53 Honmachi, Odawara City, T250	0465(22)4168
Kanagawa Textile Research Institute	4408 Hanbara, Ako-cho, Ako-gun, Kanagawa, T243-03	0462(81)1132
Kanagawa Furniture Research Center	896-5 Sugikubo, Ebina City, T243-04	0462(38)3031
Kanagawa Agricultural General Research Institute	496 Teradanawa, Hiratsuka City, T259-12	0463(58)0333
Yokohama Center for Small and Medium Enterprises	Asahi Kaikan 6F, 15 Nippon Odori, Yokohama C., T231	045(662)6631

List of Public Examination and Technology Centers—Part Two (Continued)

Organization	Address	Telephone
Niigata Industrial Technology Center	1-1-1 Kabuto Nishi, Matsumoto City, T950	025(244)9168
Niigata Food Products Research Laboratory	2-25 Shinsakae-machi, Kamo City, T959-13	0256(52)0448
Niigata Brewing Research Laboratory	2-5932-133 Suido-cho, Niigata City, T951	025(222)4568
Nagano Information Technology Research Institute	1-7-7 Nomizo-nishi Matsumoto City, T399	0263(25)0790
Nagano Industrial Research Institute	188 Wakazato, Nagano City, T380	0262(26)2812
Nagano Precision Machinery Research Institute	9959 Okaya City, T394	0266(23)4000
Nagano Food Products Research Institute	205-1 Aza Nishibanba, Oaza Kurita, Nagano City, T380	0262(27)3131
Nagano General Forestry Information Center	5739 Oaza Kataoka, Shiojiri City, T399-07	0263(52)0600
Yamanashi-Fuji Industrial Technology Center	2095 Shimoyoshida, Fujiyoshida City, T403	0555(22)2100
Yamanashi Industrial Technology Center	2094 Otsu-cho, Kofu City T400	0552(43)6111
Shizuoka Industrial Technology Center, Shizuoka	2078 Maki-ga-ya, Shizuoka City T421-21	054(278)3023
Shizuoka Industrial Technology Center, Hamamatsu	8950 Toda-cho, Hamamatsu City, 431-21	053(428)4151
Shizuoka Industrial Technology Center, Fuji	2590-1 Obuchi, Fuji City, T417	0545(35)5190
Shizuoka Industrial Technology Center, Numazu	3981-1 O-oka, Numazu City, T410	0559(25)1100
Shizuoka Design Center for Small-Medium Enterprises	44-1 Otemachi, Shizuoka City, T420	054(273)4335
Shizuoka Center for New Industries	2992 Nakajima, Shizuoka City, T422	054(281)2100

List of Public Examination and Technology Centers—Part Three

Organization	Director	Staff	Research Areas
Hokkaido Pref. Industrial Research Institute	T. Maruyama	109	M,Me,Ch,I,Ce,B,F,Mi,El
Hokkaido Pref. Forestry Research Laboratory	H. Nakagawa	162	Ch,I
Hokkaido Pref. Underground Resources Research Institute	F. Hayakawa	42	Ch,Mi
Hokkaido Pref. Cold Region Urban Research Institute	Y. Nakamura	50	Cn,Ce
Hokkaido Environmental Science Research Center	K. Hirano	48	Ep
Hokkaido Pref. Industrial Technology Center	O. Sato	27	M,Me,Ch,El,F
Asahikawa Industrial Science and Technology Center	A. Kato	10	M,Me
Asahikawa Industrial Arts Institute	S. Nakajima	27	I,Ce
Kitami Industrial Science and Technology Center	J. Oishi	10	M,Me,I
Obihiro Industrial Technology Center	N. Takahashi	4	M,ME,I
Hokkaido Food Processing Center	S. Aoki	45	F
Aomori Industrial Technology Center	Y. Mochizuki	22	M,Ch,El
Aomori Industrial Research Institute	K. Fukuta	30	Ch,T,Ce,B,F
Aomori Industrial Research Institute, Aomori Woodworking Institute	F. Shinogi	15	Ie
Aomori Machinery and Metals Research Institute	H. Amauchi	14	M,Ch,El,B
Aomori Marine Products Processing Research Institute	M. Akaba	12	M,Me,Ch
Iwate Industrial Research Institute	T. Okada	41	F
Iwate Brewing and Foodstuff Research Laboratory	K. Taniguchi	15	M,Me,Ch,T,I,Ce,El,Ep
Iwate Fisheries Research Laboratory	S. Shibui	41	B,F
Akita Industrial Technology Center	S. Kadowaki	60	F (processed)
Akita Brewing Research Laboratory	T. Samuta	16	M,Me,Ch,Ce,I,EP,El,Cn
Akita Environmental Technology Center	K. Kataoka	22	B,F
Inawashiro Technology Development Center	K. Otaka	5	Ep
Yamagata Industrial Research Institute	R. Tamiya	104	I

List of Public Examination and Technology Centers—Part Three (Continued)

Organization	Director	Staff	Research Areas
Miyagi Industrial Research Institute	K. Saito	41	M,Me,El,Ch,I,Ce,B,F
Fukushima Pref. High-Tech Plaza	K. Sakai	90	M,Me,Ch,I,Ce,El,B,Ep
Fukushima Pref. High-Tech Plaza, Fukushima Branch	K. Fujita	(17)	M,Me,El,Ch,Ce
Fukushima Pref. High-Tech Plaza, Aizuwakamatsu Branch	Y. Saito	(22)	I,Ce,B,F,P
Fukushima Pref. High-Tech Plaza, Iwaki Branch	T. Kanno	(8)	M,Me,Ch
Ibaragi Industrial Research Institute	T. Dan	71	M,Me,I,El,Ch,B,Ce,T,F
Tochigi Industrial Technology Center	M. Tanidabe	35	M,Me,I,El
Tochigi Textile Research Laboratory	I. Omachi	23	T
Tochigi Center for Commerce and Industry	K. Watanabe	22	M,Me,Ch,T
Tochigi Tsumugi Textile Research Laboratory	H. Iwano	10	T
Tochigi Food Products Research Laboratory	K. Umeyama	15	B,F
Tochigi Ceramics Research Institute	K. Kosugo	12	Ce
Gunma Industrial Research Institute	H. Seyama	49	M,El,Me,Ch,I,B,F
Gunma Textile Research Laboratory	T. Tejima	28	T
Gunma Agricultural Processing Center	S. Fukushima	9	F
Saitama Mold and Machinery Research Laboratory	R. Katsunuma	33	M,Me
Saitama Textile Research Laboratory	H. Susa	42	T
Saitama Paper Manufacturing Research Laboratory	H. Tenkai	7	P
Saitama Food Products Research Laboratory	T. Yatsumori	17	B,F
Saitama Industrial Technology Research Institute	S. Kurosu	36	I,Ch,El,Ce
Saitama Horticulture Research Laboratory	Y. Matsumura	62	Pk
Saitama Environmental Pollution Center	H. Okanao	40	Ep
Chiba Industrial Research Institute	Y. Suzuki	30	I,B,F,R,El
Chiba Machinery and Metals Research Institute	A. Muto	39	M,Me,El
Chiba Agricultural Research Laboratory	S. Masubuchi	186	F
Tokyo Municipal Industrial Research Institute	K. Otomo	199	I,M,Me,El,Ch
Tokyo Municipal Textile Research Laboratory	H. Matsubara	84	T
Tokyo Municipal General Isotope Research Institute	K. Sanai	68	Ra
Tokyo Municipal Food Products Technology Center	A. Watanabe	20	F
Tokyo Municipal Leather Technology Center	H. Okamura	14	L
Tokyo Municipal Livestock Research Laboratory	T. Nakajima	76	Ch,F
Kanagawa Industrial Research Institute	Y. Shibata	189	M,Me,Ch,T,El,Ra
Kanagawa Industrial Arts Institute	C. Nagamatsu	19	I
Kanagawa Textile Research Institute	T. Yamazawa	13	T
Kanagawa Furniture Research Center	H. Ugawa	10	I
Kanagawa Agricultural General Research Institute	N. Tsurashima	62	F
Yokohama Center for Small and Medium Enterprises	S. Hiramatsu	39	Me,Ch,I
Niigata Industrial Technology Center	A. Yoshida	104	M,Me,Ch,T,Mfg,El,Ce
Niigata Food Products Research Laboratory	S. Imai	19	B,F
Niigata Brewing Research Laboratory	T. Suzuki	6	B
Nagano Information Technology Research Institute	J. Miyazawa	39	T,In,Me
Nagano Industrial Research Institute	K. Wada	36	M,Me,Ch,I
Nagano Precision Machinery Research Institute	K. Okubo	43	M,Ch,El
Nagano Food Products Research Institute	S. Baba	23	B,F,Pk,Ch

List of Public Examination and Technology Centers—Part Three (Continued)

Organization	Director	Staff	Research Areas
Nagano General Forestry Information Center	H. Shigeki	26	I
Yamanashi-Fuji Industrial Technology Center	A. Wada	23	T,M,El
Yamanashi Industrial Technology Center	E. Nakamura	76	T,M,I,Me,B,F
Shizuoka Industrial Technology Center, Shizuoka	H. Nakatsuka	68	M,Me,Ch,I,B,El,F
Shizuoka Industrial Technology Center, Hamamatsu	K. Furuhashi	47	T,M,Me,Ch,El
Shizuoka Industrial Technology Center, Fuji	K. Kuboshima	23	P,El,M
Shizuoka Industrial Technology Center, Numazu	K. Tarumoto	18	M,Me,Ch,El
Shizuoka Design Center for Small-Medium Enterprises	A. Kamoshida	5	D
Shizuoka Center for New Industries	F. Onaga	25	I

Key: M: Machinery, Me: Metals, MF: Manufactured Products, Ch: Chemicals, L: Leather, D: Design, P: Plastics, T: Textiles, I: Industrial Technology, Ce: Ceramics, P: Paper, El: Electronics, Mi: Mining, B: Brewing, Pk: Packaging, Ep: Environmental pollution, Cn: Construction, F: Food Products, Ra: Radiation, R: Resources, W: Wood, In: Information, Ph: Pharmaceuticals

List of Public Examination and Technology Centers—Part Four

Organization	Affiliated Committees and Subcommittees							
	MM	CH	TX	MG	CI	EP	MO	EL
Hokkaido Pref. Industrial Research Institute	X	X		X	X	X		X
Hokkaido Pref. Forestry Research Laboratory				X				X
Hokkaido Pref. Underground Resources Research Inst.		X			X	X		
Hokkaido Pref. Cold Region Urban Research Institute					X	X		
Hokkaido Environmental Science Research Center						X		
Hokkaido Pref. Industrial Technology Center								
Asahikawa Industrial Science and Technology Center	X							
Asahikawa Industrial Arts Institute				X	X			
Kitami Industrial Science and Technology Center	X			X				
Obihiro Industrial Technology Center								
Hokkaido Food Processing Center							X	
Aomori Industrial Technology Center	X						X	X
Aomori Industrial Research Institute		X		X	X	X	X	
Aomori Industrial Research Institute, Woodworking Inst.				X				
Aomori Machinery and Metals Research Institute	X	X						
Aomori Marine Processing Research Institute							X	
Iwate Industrial Research Institute	X	X	X	X	X	X		X
Iwate Brewing and Foodstuff Research Laboratory				X			X	
Iwate Fisheries Research Laboratory							X	
Akita Industrial Technology Center	X	X		X	X	X		X

List of Public Examination and Technology Centers—Part Four (Continued)

Organization	Affiliated Committees and Subcommittees							
	MM	CH	TX	MG	CI	EP	MO	EL
Akita Brewing Research Laboratory				X			X	
Akita Environmental Technology Center						X		
Inawashiro Technology Development Center				X				
Yamagata Industrial Research Institute	X	X	X	X	X	X	X	X
Miyagi Industrial Research Institute	X	X		X	X	X	X	X
Fukushima Pref. High-Tech Plaza	X	X				X		X
Fukushima Pref. High-Tech Plaza, Fukushima Branch	X	X	X			X		X
Fukushima Pref. High-Tech Plaza, Aizuwakamatsu Branch		X		X	X		X	
Fukushima Pref. High-Tech Plaza, Iwaki Branch	X	X				X		X
Ibaragi Industrial Research Institute	X	X	X	X	X	X	X	X
Tochigi Industrial Technology Center	X	X		X				X
Tochigi Textile Research Laboratory			X					
Tochigi Center for Commerce and Industry	X	X	X					
Tochigi Tsumugi Textile Research Laboratory			X					
Tochigi Food Products Research Laboratory				X			X	
Tochigi Ceramics Research Institute					X			
Gunma Industrial Research Institute	X	X		X	X	X	X	X
Gunma Textile Research Laboratory			X			X		
Gunma Agricultural Processing Center							X	
Saitama Mold and Machinery Research Laboratory	X	X						
Saitama Textile Research Laboratory			X					
Saitama Paper Manufacturing Research Laboratory		X		X				
Saitama Food Products Research Laboratory				X		X	X	
Saitama Industrial Technology Research Institute		X		X	X	X		X
Saitama Horticulture Research Laboratory				X			X	
Saitama Environmental Pollution Center						X		
Chiba Industrial Research Institute		X		X		X	X	X
Chiba Machinery and Metals Research Institute	X	X				X		X
Chiba Agricultural Research Laboratory								X
Tokyo Municipal Industrial Research Institute	X	X		X	X	X		X
Tokyo Municipal Textile Research Laboratory			X					X

List of Public Examination and Technology Centers—Part Four (Continued)

Organization	Affiliated Committees and Subcommittees							
	MM	CH	TX	MG	CI	EP	MO	EL
Tokyo Municipal General Isotope Research Institute						X		
Tokyo Municipal Food Products Technology Center							X	
Tokyo Municipal Leather Technology Center		X				X		
Tokyo Municipal Livestock Research Laboratory							X	
Kanagawa Industrial Research Institute	X	X	X	X		X	X	X
Kanagawa Industrial Arts Institute				X				
Kanagawa Textile Research Institute			X					
Kanagawa Furniture Research Center				X				
Kanagawa Agricultural General Research Institute				X			X	
Yokohama Center for Small and Medium Enterprises	X	X		X				X
Niigata Industrial Research Institute	X	X	X	X	X	X		X
Niigata Food Products Research Laboratory				X			X	
Niigata Brewing Research Laboratory							X	
Nagano Information Technology Research Institute	X	X	X			X		X
Nagano Industrial Research Institute	X	X		X	X	X		X
Nagano Precision Machinery Research Institute	X	X				X		X
Nagano Food Products Research Institute				X			X	
Nagano General Forestry Information Center				X				
Yamanashi-Fuji Industrial Technology Center	X		X					X
Yamanashi Industrial Technology Center	X	X	X	X		X	X	X
Shizuoka Industrial Technology Center, Shizuoka	X	X		X	X	X	X	X
Shizuoka Industrial Technology Center, Hamamatsu		X	X			X		X
Shizuoka Industrial Technology Center, Fuji		X		X		X		X
Shizuoka Industrial Technology Center, Numazu	X						X	X
Shizuoka Design Center for Small-Medium Enterprises			X	X				
Shizuoka Center for New Industries				X				

Key: MM: Mach/Metals, CH: Chemicals, TX: Textiles, MG: Manufacturing, CI: Ceramics, EP: Pollution, MO: Microbes, EL: Electronics

Listing of Public Examination and Research Centers—Part One

District	No.	Local Affiliate	Organization
Chubu	401	Aichi Pref.	Aichi Industrial Technology Center
	402	Aichi Pref.	Aichi Food Products Research Center
	403	Aichi Pref.	Aichi-Mikawa Fiber Research Center
	404	Aichi Pref.	Aichi-Owari Fiber Research Center
	405	Aichi Pref.	Aichi-Tokoname Ceramics Research Center
	406	Aichi Pref.	Aichi-Seto Ceramics Research Center
	407	Aichi Pref.	Aichi Environmental Pollution Investigation Center
	408	Nagoya City	Nagoya Industrial Research Institute
	409	Gifu Pref.	Gifu Industrial Technology Center
	410	Gifu Pref.	Gifu Textile Research Laboratory
	411	Gifu Pref.	Gifu Metals Research Laboratory
	412	Gifu Pref.	Gifu Paper Manufacturing Research Institute
	413	Gifu Pref.	Gifu Ceramics Research Institute
	414	Gifu Pref.	Gifu Industrial Arts Institute
	415	Gifu Pref.	Gifu Forestry Center
	416	Tajima City	Tajimi Ceramic Design Research Center
	417	Doki City	Doki Ceramics Research Laboratory
	418	Mizunami City	Mizunami Ceramics Research Laboratory
	419	Mie Pref.	Mie Industrial Technology Center
	420	Mie Pref.	Mie Metallurgical Research Laboratory
	421	Mie Pref.	Mie Ceramics Research Laboratory
	422	Ise City	Ise Industrial Arts Institute
	423	Toyama Pref.	Toyama Industrial Technology Center
	424	Toyama Pref.	Toyama Forestry Research Center
	425	Toyama Pref.	Toyama Pharmaceutical Research Institute
	426	Toyama Pref.	Toyama Food Products Research Institute
	427	Takaoka City	Takaoka Industrial Arts Design Center
	428	Ishikawa Pref.	Ishikawa Industrial Research Institute
	429	Ishikawa Pref.	Ishikawa Kutani-Yaki Pottery Research Laboratory
	430	Ishikawa Pref.	Ishikawa Forestry Research Laboratory, Ishikawa Wood Center
	431	Yamanaka Town	Yamanaka Lacquerware Research Institute
	432	Wajima City	Wajima Lacquerware Research Institute
Kinki	501	Fukui Pref.	Fukui Industrial Research Institute
	502	Fukui Pref.	Fukui Research Institute for Processed Foods
	503	Takeo City	Takeo Industrial Research Institute
	504	Shiga Pref.	Shiga Pref. Machinery and Metals Research Institute
	505	Shiga Pref.	Shiga Textile Information Center
	506	Shiga Pref.	Shiga Shiragaki Ceramics Research Laboratory
	507	Shiga Pref.	Shiga Industrial Research Institute
	508	Kyoto Pref.	Kyoto Center for Small and Medium Enterprises
	509	Kyoto Pref.	Kyoto Textile Information Center
	510	Kyoto City	Kyoto Industrial Research Institute
	511	Kyoto City	Kyoto Dyeing and Weaving Research Institute
	512	Nara Pref.	Nara Industrial Research Institute

Listing of Public Examination and Research Centers—Part One (Continued)

District	No.	Local Affiliate	Organization
Kinki	513	Nara Pref.	Nara Trade and Tourism Center
	514	Nara Pref.	Nara Forestry Research Laboratory
	515	Nara Pref.	Nara Pharmaceutical Information Center
	516	Osaka Pref.	Osaka Pref. Industrial Technology and General Research Center
	517	Osaka Pref.	Osaka Pref. Central Industrial Design & Research Center
	518	Osaka City	Osaka Pref. Industrial Research Institute
	519	Osaka City	Osaka Pref. Environmental Science Research Institute
	520	Hyogo Pref.	Hyogo Pref. Industrial Technology Center
	521	Hyogo Pref.	Hyogo Pref. Environmental Pollution Research Institute
	522	Hyogo Pref.	Hyogo Pref. Central Agricultural Research Center
	523	Wakayama Pref.	Wakayama Industrial Technology Center
	524	Wakayama Pref.	Wakayama Lacquerware Research Laboratory
Chugoku	601	Tottori Pref.	Tottori Industrial Research Institute
	602	Tottori Pref.	Tottori Research Institute for Processed Foods
	603	Shimane Pref.	Shimane Pref. Industrial Technology Center
	604	Okayama Pref.	Okayama Industrial Technology Center
	605	Hiroshima Pref.	Hiroshima Pref. W. Industrial Technology Center
	606	Hiroshima Pref.	Hiroshima Pref. E. Industrial Technology Center
	607	Hiroshima Pref.	Hiroshima Pref. Industrial Food Technology Center
	608	Hiroshima City	Hiroshima Industrial Technology Center
	609	Yamaguchi Pref.	Yamaguchi Industrial Technology Center

Listing of Public Examination and Research Centers—Part Two

Organization	Address	Telephone
Aichi Industrial Technology Center	Nishi Shinwari, Hitotsuki-cho, Kaya City, T448	0566(24)1841
Aichi Food Products Research Center	2-1-1 Shinfukutera-machi, Nishi-ku, Nagoya T451	052(521)9316
Aichi-Mikawa Fiber Research Center	109 Igakubo, Otsuka-cho, Gamagori City T443	0533(59)7146
Aichi-Owari Fiber Research Center	35 Aza Miyaura, Yamato-cho, Ichinomiya City T491	0586(45)7871
Aichi-Tokoname Ceramics Research Center	4-50 Oso-cho, Tokoname City, T479	05693(5)5151
Aichi-Seto Ceramics Research Center	537 S. Yamaguchi-cho, Seto City, T489	0561(21)2116
Aichi Environmental Pollution Investigation Center	7-6 Aza Nagare, Tsuji-machi, Kita-ku, Nagoya T462	052(911)3111
Nagoya Industrial Research Institute	6-3-4-41 Atsuta-ku, Nagoya City, T456	052(661)3161
Gifu Industrial Technology Center	47 N. Oyobi, Kasamatsu-cho, Hashima, Gifu, T501-61	05838(8)3151
Gifu Textile Research Laboratory	47 N. Oyobi, Kasamatsu-cho, Hashima, Gifu, T501-61	05838(8)3151
Gifu Metals Research Laboratory	1288 Kose, Seki City, T501-32	0575(22)0147
Gifu Paper Manufacturing Research Institute	777 Maeno, Mino City, T501-37	0575(33)1241
Gifu Ceramics Research Institute	3-11 Hoshigadai, Tajima City, T507	0572(22)5381
Gifu Industrial Arts Institute	1554 Yamada-cho, Takayama City, T506	0577(33)5252
Gifu Forestry Center	1128-1 Soyo, Mino City, T501-37	0575(33)2585
Tajimi Ceramic Design Research Center	2-77 Misaka-cho, Tajima City, T507	0572(22)4731
Doki Ceramics Research Laboratory	1556-2 Dachi-machi, Doki City, T509-54	0572(5)8312
Mizunami Ceramics Research Laboratory	5-5-1 Kamihira-cho, Mizura City, T509-61	0572(68)2111
Mie Industrial Technology Center	3485 Aza Otsuka, Komori, Takachaya, Tsu City, T514	0592(34)4036
Mie Metallurgical Research Laboratory	208 Aza Nishiyama, Oazashichi, Kuwana City, T511	0594(31)0300

Listing of Public Examination and Research Centers—Part Two (Continued)

Organization	Address	Telephone
Mie Ceramics Research Laboratory	788 Higashi Akuragawa, Yokkaichi City, T510	0593(31)2381
Ise Industrial Arts Institute	5-14-43 Ichi-no-ki, Ise City, T516	0596(28)4397
Toyama Industrial Technology Center	150 Nikami-cho, Takaoka City, T933	0766(21)2121
Toyama Forestry Research Center	4940 Kurakawashin, Kosugi-cho, Toyama, T939-03	0766(56)2815
Toyama Pharmaceutical Research Institute	17-1 Naka Taikoyama, Kosugi-cho, Toyama, T939-03	0766(56)6026
Toyama Food Products Research Institute	360 Yoshioka, Toyama City, T939	0764(29)5400
Takaoka Industrial Arts Design Center	Chiiki Jiba Sangyo Center 4F, 1-1 Kaihatsu Honmachi, Takaoka City, T933	0766(22)2317
Ishikawa Industrial Research Institute	1-Guchi, Tomizo-cho, Kanazawa City T920-020	0762(67)8080
Ishikawa Kutani-Yaki Pottery Research Laboratory	Ha-21-3 Shorenji-cho, Komatsu City, T923-01	0761(47)3631
Ishikawa Forestry Research Laboratory, Ishikawa Wood Center	73-1 Aza Yoshioka Higashi, Kawachi-mura, T920-23	07619(3)1873
Yamanaka Lacquerware Research Institute	1-102 Tsukaya-cho, Yamanaka-machi, Ishikawa, T922-01	07617(8)0425
Wajima Lacquerware Research Institute	24-55 Kawai-machi, Nagahama City, T928	0768(22)2211
Fukui Industrial Research Institute	10 Aza N. Inada, 61 Kawai Washizuka-cho, Fukui, T910	0766(55)0664
Fukui Research Institute for Processed Foods	1-1 Aza Ogawara, Tsubo-no-uchi, Maruoka-cho, Sakai-gun, Fukui, T910-02	0776(61)3539
Takeo Industrial Research Institute	49-6 Ikenoue-cho, Takeo City, Fukui, T915	0778(22)1241
Shiga Pref. Machinery and Metals Research Institute	52 Oka-machi, Hikone City, T522	0749(22)2325
Shiga Textile Information Center	27-39 Mitsuya Motomachi, Nagahama City, T526	0749(62)1492
Shiga Shiragaki Ceramics Research Laboratory	498 Nagano, Shigaraki-cho, Koga-gun, Shiga, T529-18	0748(82)1155
Shiga Industrial Research Institute	232 Kamitoyama, Ritto-cho, Kurita, Shiga, T520-30	0775(58)1500
Kyoto Center for Small and Medium Enterprises	17 Minami-machi, Chudo-ji, Shimogyo-ku, Kyoto, T600	075(315)2811
Kyoto Textile Information Center	139-1 Aza Tanba, Mineyama-cho, Naka-gun, Kyoto, T627	0772(62)0074
Kyoto Industrial Research Institute	17 Minami-machi, Chudo-ji, Shimogyo-ku, Kyoto, T600	075(311)3171
Kyoto Dyeing and Weaving Research Institute	647-20 Sokoku-ji Monzen-cho, Kamidachiuri Agaru, Kara-suma-dori, Kamigyo-ku Kyoto, T602	075(441)3165
Nara Industrial Research Institute	129-1, Kashiwagi-cho, Nara City, T630	0742(33)0817
Nara Trade and Tourism Center	38-1 Noborioji-cho, Nara City, T630	0742(22)6601
Nara Forestry Research Laboratory	Kibi, Takatori-cho, Takaichi-gun, Nara, T635-01	0744(52)2380
Nara Pharmaceutical Information Center	605-10 Gosho City, T639-22	07456(2)2376
Osaka Pref. Industrial Technology and General Research Center	2-1-53 Enoshima, Nishi-ku, Osaka, T550	06(443)1121
	Osaka Shoko Kaikan, 4-3-6 Minami Honmachi, Chuo-ku, Osaka, T541	06(281)0327
Osaka Pref. Industrial Design & Research Center	22-28, Asahi-machi, Izumi Otsu City, T595	0725(33)8810
Osaka Pref. Industrial Research Institute	1-6-50 Morinomiya, Joto-ku, Osaka T536	06(969)1031
Osaka Pref. Environmental Science Research Institute	8-34 Higashi Ue-machi, Tennoji-ku, Osaka, T543	06(771)8331
Hyogo Pref. Industrial Technology Center	3-1-12 Yukihiro-cho, Suma-ku, Kobe City, T654	078(731)4481
Hyogo Pref. Environmental Pollution Research Inst.	3-1-27 Yukihiro-cho, Suma-ku, Kobe City, T654	078(735)6911
Hyogo Pref. Central Agricultural Research Center	Ko-1533, Minami-no-oka, Beppu-cho, Kasai C., T679-01	0790(47)1117
Wakayama Industrial Technology Center	60 Ogura, Wakayama City, T649-62	0734(77)1271
Wakayama Lacquerware Research Laboratory	226-2 Funao, Kainan City, T642	0734(82)0844
Tottori Industrial Research Institute	390 Akisato, Tottori City, T680	0857(22)8321
Tottori Research Institute for Processed Foods	2032-1 Nakano-cho, Sakaiminato City, T684	0859(44)6121
Shimane Pref. Industrial Technology Center	219 Izumokyo, Izumo-cho, Yotsuka, Shimane, T699-01	0852(52)4480

Listing of Public Examination and Research Centers—Part Two (Continued)

Organization	Address	Telephone
Okayama Industrial Technology Center	4-3-18 Ifuku-cho, Okayama City, T700	0862(52)4480
Hiroshima Pref. W. Industrial Technology Center	3-6-21 Chuo, Kure City, T737	0823(52)5136
Hiroshima Pref. E. Industrial Technology Center	3-232-6 Fukatsu-cho, Fukuyama City, T721	0849(31)2400
Hiroshima Pref. Industrial Food Technology Center	12-70 Honmachi, Hijiya, S. Ward, Hiroshima, T732	082(251)7431
Hiroshima Industrial Technology Center	3-8-24 Senda-cho, Naka-ku, Hiroshima, T730	082(242)4170
Yamaguchi Industrial Technology Center	585-1 Aza Yugaki, Oaza Asada, Yamaguchi City, T753	0839(22)6810

Listing of Public Examination and Research Centers—Part Three

Organization	Director	Staff	Research Areas
Aichi Industrial Technology Center	S. Fujii	66	M,Me,Ch,I,Pk
Aichi Food Products Research Center	T. Harada	47	B,F
Aichi-Mikawa Fiber Research Center	K. Sawada	35	T
Aichi-Owari Fiber Research Center	M. Yazawa	44	T
Aichi-Tokoname Ceramics Research Center	T. Morikawa	26	Ce
Aichi-Seto Ceramics Research Center	M. Nakamura	25	Ce
Aichi Environmental Pollution Investigation Center	O. Naruse	64	Ep
Nagoya Industrial Research Institute	J. Terada	107	M,Me,Ch,Ce,El
Gifu Industrial Technology Center	S. Kishigami	37	Ch,F,B,El
Gifu Textile Research Laboratory	S. Watanabe	24	T
Gifu Metals Research Laboratory	H. Sekiya	20	M,Me,Ch,El
Gifu Paper Manufacturing Research Institute	K. Satake	15	P
Gifu Ceramics Research Institute	I. Murase	26	Ce
Gifu Industrial Arts Institute	T. Yokota	17	Mfg
Gifu Forestry Center	I. Imori	33	I
Tajimi Ceramic Design Research Center	N. Mizuno	25	Ce
Doki Ceramics Research Laboratory	Y. Ohashi	13	Ce
Mizunami Ceramics Research Laboratory	T. Makino	10	Ce
Mie Industrial Technology Center	K. Hayashi	54	Ch,T,I,M,F,B,Me,El,Ep
Mie Metallurgical Research Laboratory	M. Kawabata	14	Me
Mie Ceramics Research Laboratory	M. Nishida	19	Ce
Ise Industrial Arts Institute	M. Sakata	7	Ch,I
Toyama Industrial Technology Center	T. Yamamoto	74	M,Me,Ch,I,Ce,El,T
Toyama Forestry Research Center	R. Karazawa	36	Mf
Toyama Pharmaceutical Research Institute	H. Saito	18	Ph
Toyama Food Products Research Institute	N. Kubo	20	F
Takaoka Industrial Arts Design Center	M. Hori	5	D
Ishikawa Industrial Research Institute	T. Ishida	96	M,Me,Ch,T,Mf,Ce,F,El
Ishikawa Kutani-Yaki Pottery Research Laboratory	M. Mishima	9	Ce
Ishikawa Forestry Research Laboratory, Ishikawa Wood Center	S. Sanbayashi	4	I
Yamanaka Lacquerware Research Institute	K. Okura	3	I
Wajima Lacquerware Research Institute	T. Kato	3	I
Fukui Industrial Research Institute	T. Kobayashi	96	M,Me,Ch,I,T,Ce,El
Fukui Research Institute for Processed Foods	T. Nakamura	16	F

Listing of Public Examination and Research Centers—Part Three (Continued)

Organization	Director	Staff	Research Areas
Takeo Industrial Research Institute	S. Ikeda	7	M,I,Me
Shiga Pref. Machinery and Metals Research Institute	N. Ueda	9	M,Me
Shiga Textile Information Center	H. Maekawa	19	T
Shiga Shiragaki Ceramics Research Laboratory	Y. Imanishi	16	Ce
Shiga Industrial Research Institute	S. Otsuki	26	M,Me,Ch,I,F,El,D
Kyoto Center for Small and Medium Enterprises	B. Kondo	85	M,Me,Ch,I,F,El
Kyoto Textile Information Center	T. Kojima	40	T
Kyoto Industrial Research Institute	T. Kamon	45	Me,Ch,Mfg,Ce,B,El
Kyoto Dyeing and Weaving Research Institute	H. Yamada	42	T
Nara Industrial Research Institute	M. Okuda	35	M,Me,Ch,T,I,Ce,F
Nara Trade and Tourism Center	K. Nishii	10	I
Nara Forestry Research Laboratory	S. Nakanishi	39	I
Nara Pharmaceutical Information Center	S. Jo	9	Ph
Osaka Pref. Industrial Technology and General Research Center	S. Hata	224	M,Me,Ch,Ce,El,T
Osaka Pref. Central Industrial Design & Research Center	S. Imatake	18	D
Osaka Pref. Industrial Research Institute	T. Hirashima	120	M,Me,Ch,T,Ce,El,F
Osaka Pref. Environmental Science Research Institute	M. Nagasawa	119	Ep,F
Hyogo Pref. Industrial Technology Center	T. Terai	118	M,Me,Ch,T,I,Ce,Pk,F,L
Hyogo Pref. Environmental Pollution Research Institute	M. Kobayashi	44	Ep
Hyogo Pref. Central Agricultural Research Center	S. Yoshifusa	216	Mz,F
Wakayama Industrial Technology Center	Y. Tsuji	58	M,Me,Ch,T,W,B,F,L,In
Wakayama Lacquerware Research Laboratory	M. Hosobo	9	M
Tottori Industrial Research Institute	T. Okamoto	38	Me,P,T,Mf,Ce,B,M,El
Tottori Research Institute for Processed Foods	Y. Yamazaki	15	F
Shimane Pref. Industrial Technology Center	N. Sakai	39	M,Me,Ch,I,Ce,F,P,Mi,Ep,B
Okayama Industrial Technology Center	H. Takatani	76	M,Me,Ch,T,I,Ce,B,F
Hiroshima Pref. W. Industrial Technology Center	I. Oshita	52	M,Me,Ch,Ce
Hiroshima Pref. E. Industrial Technology Center	M. Takasaki	49	T,M,Me,El,D,I
Hiroshima Pref. Industrial Food Technology Center	Y. Sakaki	38	B,F
Hiroshima Industrial Technology Center	K. Yamamoto	30	M,Ch,I,Me,El
Yamaguchi Industrial Technology Center	Y. Inoki	47	M,Me,Ch,T,I,Ce,B,F,El,D

Key: M: Machinery, Me: Metals, Mf: Manufactured products, Ch: Chemicals, L: Leather, D: Design, P: Plastics, T: Textiles, I: Industrial technology, Ce: Ceramics, P: Paper, El: Electronic, Mi: Mining, B: Brewing, Pk: Packaging, Ep: Environmental pollution, Cn: Construction, F: Food Products, Ra: Radiation, R: Resources, W: Wood, In: Information, Ph: Pharmaceuticals, Mz: Miniaturization

Listing of Public Examination and Research Centers—Part Four

Organization	Affiliated Committees and Subcommittees							
	MM	CH	TX	MG	CI	EP	MO	EL
Aichi Industrial Technology Center	X	X		X	X	X		X
Aichi Food Products Research Center		X		X		X	X	
Aichi-Mikawa Fiber Research Center			X			X		
Aichi-Owari Fiber Research Center			X			X		X
Aichi-Tokoname Ceramics Research Center		X		X	X	X		
Aichi-Seto Ceramics Research Center		X		X	X	X		
Aichi Environmental Pollution Investigation Center						X		
Nagoya Industrial Research Institute	X	X	X		X	X		X
Gifu Industrial Technology Center	X	X		X		X	X	X
Gifu Textile Research Laboratory			X			X		X
Gifu Metals Research Laboratory	X	X				X		X
Gifu Paper Manufacturing Research Institute		X		X		X		
Gifu Ceramics Research Institute				X	X	X		
Gifu Industrial Arts Institute				X				
Gifu Forestry Center				X				
Tajimi Ceramic Design Research Center				X	X			
Doki Ceramics Research Laboratory				X	X			
Mizunami Ceramics Research Laboratory				X	X			
Mie Industrial Technology Center	X	X	X	X		X	X	X
Mie Metallurgical Research Laboratory	X	X				X		X
Mie Ceramics Research Laboratory		X			X			
Ise Industrial Arts Institute				X		X		
Toyama Industrial Technology Center	X	X	X	X	X	X		X
Toyama Forestry Research Center				X				
Toyama Pharmaceutical Research Institute		X						
Toyama Food Products Research Institute							X	
Takaoka Industrial Arts Design Center				X				
Ishikawa Industrial Research Institute	X	X	X	X	X	X	X	X
Ishikawa Kutani-Yaki Pottery Research Laboratory		X		X	X	X		
Ishikawa Forestry Research Laboratory, Ishikawa Wood Center				X				
Yamanaka Lacquerware Research Institute				X				
Wajima Lacquerware Research Institute				X				
Fukui Industrial Research Institute	X	X	X	X	X	X		X
Fukui Research Institute for Processed Foods							X	
Takeo Industrial Research Institute	X			X				
Shiga Pref. Machinery and Metals Research Institute	X	X				X		X
Shiga Textile Information Center			X			X		
Shiga Shiragaki Ceramics Research Laboratory				X	X			
Shiga Industrial Research Institute	X	X		X		X	X	X
Kyoto Center for Small and Medium Enterprises	X	X		X	X	X	X	X
Kyoto Textile Information Center			X				X	
Kyoto Industrial Research Institute	X	X		X	X	X	X	X
Kyoto Dyeing and Weaving Research Institute			X					

Listing of Public Examination and Research Centers—Part Four (Continued)

Organization	Affiliated Committees and Subcommittees							
	MM	CH	TX	MG	CI	EP	MO	EL
Nara Industrial Research Institute	X	X	X	X	X	X	X	X
Nara Trade and Tourism Center				X				
Nara Forestry Research Laboratory				X				
Nara Pharmaceutical Information Center		X						
Osaka Pref. Industrial Technology and General Research Center	X	X	X	X	X			X
Osaka Pref. Industrial Design & Research Center			X	X				
Osaka Pref. Industrial Research Institute	X	X			X	X	X	X
Osaka Pref. Environmental Science Research Inst.						X	X	
Hyogo Pref. Industrial Technology Center	X	X	X	X	X	X	X	X
Hyogo Pref. Environmental Pollution Institute						X		
Hyogo Pref. Central Agricultural Research Center				X			X	
Wakayama Industrial Technology Center	X	X	X	X	X	X	X	X
Wakayama Lacquerware Research Laboratory				X				
Tottori Industrial Research Institute	X	X	X	X	X	X	X	X
Tottori Research Institute for Processed Foods				X			X	
Shimane Pref. Industrial Technology Center	X	X		X	X	X	X	X
Okayama Industrial Technology Center	X	X	X	X	X	X	X	X
Hiroshima Pref. W. Industrial Technology Center	X	X			X	X		X
Hiroshima Pref. E. Industrial Technology Center	X	X	X	X		X		X
Hiroshima Pref. Industrial Food Technology Center				X		X	X	
Hiroshima Industrial Technology Center	X	X		X	X	X		X
Yamaguchi Industrial Technology Center	X	X	X	X	X	X	X	X

Key: MM: Mach/Metals, CH: Chemicals, TX: Textiles, MG: Manufacturing, CI: Ceramics, EP: Pollution, MO: Microbes, EL: Electronics

Listing of Public Examination and Research Centers—Part One

District	No.	Local Affiliate	Organization
Shikoku(12)	701	Tokushima Pref.	Tokushima Pref. Industrial Technology Center
	702	Tokushima Pref.	Tokushima Environmental Preservation Center
	703	Tokushima City	Tokushima Woodworking Center
	704-1	Kagawa Pref.	Kagawa Food Research Laboratory
	704-2	Kagawa Pref.	Kagawa Fermented Foods Research Laboratory
	705	Kagawa Pref.	Kagawa Industrial Technology Center
	706	Ehime Pref.	Ehime Industrial Technology Center
	707	Ehime Pref.	Ehime Paper Manufacturing Research Laboratory
	708	Ehime Pref.	Ehime Ceramics Research Laboratory
	709	Ehime Pref.	Ehime Research Laboratory for Textile Industry
	710	Niihama City	Niihama Municipal Industrial Research Institute
	711	Kochi Pref.	Kochi Industrial Technology Center
Kyushu(18)	801	Fukuoka Pref.	Fukuoka Industrial Technology Center
		Fukuoka Pref.	Fukuoka Industrial Technology Center, Chemical Fiber Research Laboratory

Listing of Public Examination and Research Centers—Part One (Continued)

District	No.	Local Affiliate	Organization
Kyushu (18) (continued)		Fukuoka Pref.	Fukuoka Industrial Technology Center, Materials Development Research Laboratory
		Fukuoka Pref.	Fukuoka Industrial Technology Center, Interior Research Laboratory
		Fukuoka Pref.	Fukuoka Industrial Technology Center, Machinery and Electronics Research Laboratory
	802	Fukuoka Pref.	Fukuoka General Agricultural Research Institute, Chikugo Laboratory
	803	Saga Pref.	Saga Industrial Research Institute
	804	Saga Pref.	Saga Ceramics Research Laboratory
	805	Nagasaki Pref.	Nagasaki Industrial Technology Center
	806	Nagasaki Pref.	Nagasaki Industrial Ceramics Center
	807	Kumamoto Pref.	Kumamoto Industrial Technology Center
	808	Kumamoto Pref.	Kumamoto Processed Foods Research Laboratory
	809	Oita Pref.	Oita Industrial Research Institute
	810	Oita Pref.	Oita Industrial Arts Institute, Hita
	811	Oita Pref.	Oita Industrial Arts Institute, Beppu
	812	Beppu City	Beppu Industrial Arts Research Institute
	813	Oita Pref.	Oita Pref. Industrial Technology Research Exchange Center
	814	Miyazaki Pref.	Miyazaki Industrial Research Institute
	815	Miyazaki Pref.	Miyazaki Food Products R&D Center
	816	Kagoshima Pref.	Kagoshima Industrial Technology Center
	817	Kagoshima Pref.	Kagoshima Agricultural Products Processing Research and Information Center
	818	Kagoshima Pref.	Kagoshima Oshima Tsumugi Research and Information Center
Okinawa (2)	819		Okinawa Industrial Research Institute
	820		Okinawa Industrial Arts Institute

Listing of Public Examination and Research Centers—Part Two

Organization	Address	Telephone
Tokushima Pref. Industrial Technology Center	11-2 Nishihiraki, Saiga-cho, Tokushima City, T770	0886(69)4711
Tokushima Environmental Preservation Center	5-71 Mandai-cho, Tokushima City, T770	0886(25)7751
Tokushima Woodworking Center	1-8-22 Fukushima, Tokushima City, T770	0886(22)9625
Kagawa Food Research Laboratory	587-1 Goto-cho, Takamatsu City, T761	0878(81)3177
Kagawa Fermented Foods Research Laboratory	1351-1 Inawa-ko, Uchiumi-cho, Shodoshima-gun, Kagawa, T761-44	0879(82)0034
Kagawa Industrial Technology Center	587-1 Goto-cho, Takamatsu City, T761	0878(81)3175
Ehime Industrial Technology Center	487-2 Kumeogita-cho, Matsuyama City, T790	0899(76)7612
Ehime Paper Manufacturing Research Laboratory	281-2 Kawanoe-cho, Kawanoe City, T799-01	0896(58)2144
Ehime Ceramics Research Laboratory	2 Gohonmatsu, Tobe-cho, Iyo-gun, Ehime, T791-21	0899(62)2076
Ehime Research Laboratory for Textile Industry	2-5-48 Higashimura Minami, Imabari City, T799-15	0898(48)0021
Niihama Municipal Industrial Research Institute	142-1 Takihamu, Niihama City, T792	0897(45)2329
Kochi Industrial Technology Center	3992-3 Fushida, Kochi City, T781 51	0888(46)1111
Kochi Paper Manufacturing Research Laboratory	3-115 Asahi-machi, Kochi City, T780	0888(24)4151
Fukuoka Industrial Technology Center	332-1 Oaza Kamikoga, Tsukushino City, T818	092(925)7721
Fukuoka Industrial Technology Center, Chemical Fiber Research Laboratory	332-1 Oaza Kamikoga, Tsukushino City, T818	092(925)7721

Listing of Public Examination and Research Centers—Part Two (Continued)

Organization	Address	Telephone
Fukuoka Industrial Technology Center, Materials Development Research Laboratory	499 Oaza Inatomi, Yatume City, T834	0943(23)2361
Fukuoka Industrial Technology Center, Interior Research Laboratory	405-3 Aza Hatanaka Higashi, Oaza Kamimaki, Okawa City, T831	0944(86)3259
Fukuoka Industrial Technology Center, Machinery and Electronics Research Laboratory	3-6-1 Norimatsu Yahatanishi-ku, Kitakyushu City, T807	093(691)0260
Fukuoka General Agricultural Research Institute, Chikugo Laboratory	1003 Muta, Hachi-machi, Oki-cho, Mitsuma-gun, Fukuoka, T830-04	0944(32)1092
Saga Industrial Research Institute	114 Yatmizo, Nabeshima-cho, Saga, T849	0952(30)8161
Saga Ceramics Research Laboratory	3100-5 Otsu, Aza Tanohira, Chubu, Arita-cho, Nishi Matsuura-gun, Saga, T844	0955(43)2185
Nagasaki Industrial Technology Center	1303-8, 2-Chome, Ikeda, Omura City, T856	0957(52)1133
Nagasaki Ceramics Research Laboratory	605-2 Hikibago, Nasami-cho, Higashi Hiusu-gun Nagasaki, T859-37	0959(85)3140
Kumamoto Industrial Technology Center	3-11-38 Higashi-machi, Kumamoto City, T862	096(368)2101
Kumamoto Processed Foods Research Laboratory	3-11 Higashi-machi, Kumamoto City, T862	096(368)3600
Oita Industrial Research Institute	3239-4 Oaza Shimogori, Oita City, T870	0975(69)1855
Oita Industrial Arts Institute, Hita	3 Ishii-cho, Hita City, T877	0973(23)2213
Oita Industrial Arts Institute, Beppu	3-3 Higashi Soen-cho, Beppu City, T874	0977(22)0208
Beppu Industrial Arts Research Institute	7-14 Suehiro-cho-cho, Beppu City, T874	0977(23)1072
Oita Pref. Industrial Technology Research Exchange Center	1977-1 Oaza Nahahanda, Oita City, T879-76	0975(97)6406
Miyazaki Industrial Research Institute	1-7-14 Tsunehisa, Miyazaki City, T880	0985(51)7211
Miyazaki Food Products R&D Center	1-7-14 Tsunehisa, Miyazaki City, T880	0985(50)1488
Kagoshima Industrial Technology Center	1445-1 Oda, Hayato-cho, Aira-gun, Kagoshima, T899-51	0995(43)5111
Kagoshima Agricultural Products Processing Research and Information Center	5500 Kamifukumoto-machi, Kagoshima City, T891-01	0992(68)9325
Kagoshima Oshima Tsumugi Research and Information Center	888 Urakami, Naze City, T894	0997(52)0068
Okinawa Industrial Research Institute	1-8-39 Kimiya, Naha City, T902	098(832)2176
Okinawa Industrial Arts Institute	213 Aza Shoya, Nanpuhara-machi, Okinawa, T901-11	098(889)1186

Listing of Public Examination and Research Centers—Part Three

Organization	Director	Staff	Research Areas
Tokushima Pref. Industrial Technology Center	K. Ueda	52	M,Me,Ch,T,I,B,El,F,In,D
Tokushima Environmental Preservation Center	K. Kitamura	49	Ep,F,B
Tokushima Woodworking Center	T. Iitomi	7	I
Kagawa Food Research Laboratory	M. Ogura	13	B,F
Kagawa Fermented Foods Research Laboratory	S. Shiota	13	B,F
Kagawa Industrial Technology Center	H. Suezawa	30	M,Me,I,Ce,Ch,El
Ehime Industrial Technology Center	A. Hato	48	Me,Ch,I,F,M,B,El
Ehime Paper Manufacturing Research Laboratory	Y. Bessho	10	P
Ehime Ceramics Research Laboratory	H. Sagawa	7	Ce
Ehime Research Laboratory for Textile Industry	K. Mizuzaki	19	T
Niihama Municipal Industrial Research Institute	O. Fujita	3	
Kochi Industrial Technology Center	K. Tauchi	37	M,Me,Ch,I,Ce,F,In,D
Kochi Paper Manufacturing Research Laboratory	K. Okazaki	13	P
Fukuoka Industrial Technology Center	T. Shiozawa	128	

Listing of Public Examination and Research Centers—Part Three (Continued)

Organization	Director	Staff	Research Areas
Fukuoka Industrial Technology Center, Chemical Fiber Research Laboratory	T. Ueno	(31)	Ch,T,Ce,F
Fukuoka Industrial Technology Center, Materials Development Research Laboratory	G. Yamaguchi	(15)	I,P,Ch
Fukuoka Industrial Technology Center, Interior Research Laboratory	H. Sakamoto	(11)	I
Fukuoka Industrial Technology Center, Machinery and Electronics Research Laboratory	Y. Akahoshi	(51)	M,Me,El
Fukuoka General Agricultural Research Institute, Chikugo Laboratory	T. Takahashi	23	I
Saga Industrial Research Institute	S. Arita	34	M,Me,Ch,I,F,El
Saga Ceramics Research Laboratory	H. Takagi	22	Ce
Nagasaki Industrial Technology Center	S. Nagata	40	M,Me,Ch,El,F,D
Nagasaki Industrial Ceramics Center	H. Seki	21	Ce
Kumamoto Industrial Ceramics Center	K. Tsukitani	43	M,Me,Ch,Mfg,Ce,Mz,El
Kumamoto Processed Foods Research Laboratory	S. Uemura	16	F,Pk
Oita Industrial Research Institute	E. Yokoyama	32	M,Me,Ch,Ce,Mz,F,El
Oita Industrial Arts Institute, Hita	M. Yamamura	14	I
Oita Industrial Arts Institute, Beppu	T. Eto	12	I
Beppu Industrial Arts Research Institute	F. Kai	4	I
Oita Pref. Industrial Technology Research Exchange Center	S. Hashimoto	6	El
Miyazaki Industrial Research Institute	K. Nagano	40	M,Me,Ch,Ce,El,I
Miyazaki Food Products R&D Center	K. Nagano	19	F,B
Kagoshima Industrial Technology Center	K. Jinnai	62	M,Me,Ch,Ce,F,B,El,I
Kagoshima Agricultural Products Processing Research and Information Center	K. Matsubara	11	F
Kagoshima Oshima Tsumugi Research and Information Center	N. Niizu	18	T
Okinawa Industrial Research Institute	K. Miyagi	22	Ch,Me,Ce,B,Ep,F
Okinawa Industrial Arts Institute	Z. Teruya	13	I,T

Key: M: Machinery, Me: Metals, Mf: Manufactured Products, Ch: Chemicals, L: Leather, D: Design, P: Plastics, T: Textiles, I: Industrial Technology, Ce: Ceramics, P: Paper, El: Electronics, Mi: Mining, B: Brewing, Pk: Packaging, Ep: Environmental Pollution, Cn: Construction, F: Food Products, Ra: Radiation, R: Resources, W: Wood, In: Information, Ph: Pharmaceuticals, Mz: Miniaturization

Listing of Public Examination and Research Centers—Part Four

Organization	Affiliated Committees and Subcommittees							
	MM	CH	TX	MG	CI	EP	MO	EL
Tokushima Pref. Industrial Technology Center	X	X	X	X	X	X	X	X
Tokushima Environmental Preservation Center						X		
Tokushima Woodworking Center				X				
Kagawa Food Research Laboratory				X		X	X	
Kagawa Fermented Foods Research Laboratory				X		X	X	
Kagawa Industrial Technology Center	X	X		X	X			X
Ehime Industrial Technology Center	X	X		X		X	X	X
Ehime Paper Manufacturing Research Laboratory		X				X		
Ehime Ceramics Research Laboratory					X			
Ehime Research Laboratory for Textile Industry			X			X		

Listing of Public Examination and Research Centers—Part Four (Continued)

Organization	Affiliated Committees and Subcommittees							
	MM	CH	TX	MG	CI	EP	MO	EL
Niihama Municipal Industrial Research Institute								
Kochi Industrial Technology Center	X	X		X	X	X	X	X
Kochi Paper Manufacturing Research Laboratory		X		X				
Fukuoka Industrial Technology Center	X	X	X	X	X	X	X	X
Fukuoka Industrial Technology Center, Chemical Fiber Research Laboratory		X	X		X		X	
Fukuoka Industrial Technology Center, Materials Development Research Laboratory		X		X	X		X	
Fukuoka Industrial Technology Center, Interior Research Laboratory				X				
Fukuoka Industrial Technology Center, Machinery and Electronics Research Laboratory		X						X
Fukuoka General Agricultural Research Institute, Chikugo Laboratory				X				
Saga Industrial Research Institute	X	X		X		X	X	X
Saga Ceramics Research Laboratory				X	X	X		
Nagasaki Industrial Technology Center	X	X		X		X	X	X
Nagasaki Industrial Ceramics Center				X	X			
Kumamoto Industrial Technology Center	X	X		X	X	X	X	X
Kumamoto Processed Foods Research Laboratory				X			X	
Oita Industrial Research Institute	X	X			X	X	X	X
Oita Industrial Arts Institute, Hita				X				
Oita Industrial Arts Institute, Beppu				X				
Beppu Industrial Arts Research Institute				X				
Oita Pref. Industrial Technology Research Exchange Center								X
Miyazaki Industrial Research Institute	X	X		X	X	X		X
Miyazaki Food Products R&D Center						TcX		
Kagoshima Industrial Technology Center	X	X	X	X	X	X	X	X
Kagoshima Agricultural Products Processing Research and Information Center				X		X	X	
Kagoshima Oshima Tsumugi Research and Information Center			X					
Okinawa Industrial Research Institute	X	X			X	X	X	
Okinawa Industrial Arts Institute			X	X				
Total	67	83	45	109	59	90	66	71

Key: MM: Mach/Metals, CH: Chemicals, TX: Textiles, MG: Manufacturing, CI: Ceramics, EP: Pollution, MO: Microbes, EL: Electronics

3. Employee Technical Training Program

Small and medium size business schools that belong to small and medium size corporate groups have been conducting various training programs in order to provide the kind of knowledge and skills that those in charge of small and medium size companies affiliated with national and local public organizations will need in order to provide effective technical assistance.

Part of this training is being conducted by AIST. AIST-affiliated research laboratories have been offering technical training programs to technical specialists working in public examination and technology centers.

In the following table, we list the technical training programs being offered in 1993 at the AIST research labs.

1993 Small and Medium Enterprise Six-Month Training Programs

Training Organization	Subject
National Research Laboratory of Metrology	Applied semiconductor interference technology
	Research to upgrade injection molding and welding technology for ceramics
Mechanical Engineering Laboratory	Precision measurements by laser interferometer
	Intelligent processing data base
	Color image processing
	Micromachining of micromachine components
	Construction of genetic information analysis support system
	Basic research on shearing and bending of intermetallic compounds
National Institute for Chemicals and Materials	Hollow fiber applied technology
	Synthesis of polymer electrode materials and performing evaluations thereof
	Non-destructive measurement of fibrous polymer materials
	Control and function evaluation of polymer materials that exhibit stimulus-response characteristics
	Analyzing the characteristics of biorelated polymers and the applications thereof
	Evaluating the catalytic characteristics of oxides
Government Industrial Research Institute, Osaka	Structure and properties of polymer materials
	Polymer-alloying of thermoplastic resins
Government Industrial Research Institute, Nagoya	Synthesis of microporous crystal and functional evaluation thereof
	Synthesis of interceramic compounds
	Method of evaluating the manufacture of biocomposite ceramics
National Institute of Bioscience and Human Technology	Basic technology for breeding microorganisms
Electrotechnical Laboratory	Research on reliability of electronic elements
	Prototyping and evaluating magnetic artificial lattices
National Institute for Resources and Environment	Ozone processing of toxic organic substances

Industrial Property Licensing

94FE0219K Tokyo AGENCY OF INDUSTRIAL SCIENCE AND TECHNOLOGY in Japanese 31 Oct 93 p 547

[Text]

2. Licensing Industrial Property Rights

Total Annual Revenues from Licensing of Property Rights			
Year	License Fees (unit: yen)	Number of Claims	Total Number of Applicants
1971	183,025,262	138	216
1972	284,463,042	198	269
1973	286,635,214	208	304
1974	369,594,360	274	397
1975	468,920,764	403	695
1976	367,910,924	405	677
1977	252,126,882	384	636
1978	239,487,361	388	620
1979	205,296,730	468	635
1980	211,027,984	523	746
1981	233,906,312	559	826
1982	243,899,876	557	854
1983	239,404,138	590	882
1984	275,400,132	639	946
1985	307,988,162	681	933
1986	296,764,117	716	1,005
1987	291,134,740	748	991
1988	324,383,968	758	1,002
1989	329,219,742	661	824
1990	185,793,166	624	783
1991	198,670,437	622	790
1992	198,326,446	595	721

Licensing Status (March 31, 1991)

AIST Lab	Domestic Industrial Property Rights								Overseas		Total	
	Patents		Utility Models		Designs		Total		Licenses	Firms	Licenses	Firms
	Licenses	Firms	Licenses	Firms	Licenses	Firms	Licenses	Firms				
NAIR	0	0	0	0	0	0	0	0	0	0	0	0
NRLM	4	6	4	4	0	0	8	10	0	0	8	10
MEL	40	40	0	0	0	0	40	40	0	0	40	40
NIMC	81	106	3	3	0	0	84	109	3	9	87	118
GIRI-O	57	72	0	0	0	0	57	72	0	0	57	72
GIRI-N	12	13	0	0	0	0	12	13	0	0	12	13
NIBM	56	104	2	2	0	0	58	106	2	2	60	108
GSJ	4	4	3	4	0	0	7	8	0	0	7	8
ETL	36	37	8	8	0	0	44	45	0	0	44	45
NIRE	32	36	2	2	0	0	34	38	0	0	34	38
GIRI-H	4	4	1	1	0	0	5	5	0	0	5	5
GIRI-K	28	29	1	1	0	0	29	30	0	0	29	30
GIRI-S	13	13	0	0	0	0	13	13	0	0	13	13
GIRI-T	4	8	0	0	0	0	4	8	0	0	4	8
GIRI-C	1	1	3	3	0	0	4	4	0	0	4	4
Sub Total	372	473	27	28	0	0	399	501	5	11	404	512
LARGE	74	91	2	2	0	0	76	93	6	6	82	99
SUN	21	21	0	0	0	0	21	21	0	0	21	21
MOON	11	10	1	1	0	0	12	11	0	0	12	11
NEXT	10	12	0	0	0	0	10	12	0	0	10	12
MED	63	63	3	3	0	0	66	66	0	0	66	66
Sub Total	179	197	6	6	0	0	185	203	6	6	191	209
TOTAL	551	670	33	34	0	0	584	704	11	17	595	721

(Note: number includes applications pending; FIRMS: applicants)

Key: GIRI-O: Govt. Industrial Research Institute, Osaka; NIBH: Natl. Inst. of Bioscience and Human Technology; GIRI-N: Govt. Industrial Research Institute, Nagoya; GSL: Geological Survey of Japan; GIRI-H: Govt. Industrial Research Institute, Hokkaido; ETL: Electrotechnical Laboratory; GIRI-K: Govt. Industrial Research Laboratory, Kyushu; NIRE: Natl. Institute for Resources and Environment; GIRI-S: Govt. Industrial Research Laboratory, Shikoku; NAIR: Natl. Inst. for Adv. Interdisciplinary Research; GIRI-T: Govt. Industrial Research Laboratory, Tohoku; NRLM: Natl. Research Laboratory of Metrology; GIRI-C: Govt. Industrial Research Laboratory, Chugoku; MEL: Mechanical Engineering Laboratory; NIMC: Natl. Inst. of Materials and Chemical Research; SUN: Old Sunshine Project; LARGE: Large-Scale Project; MOON: Moonlight Project; NEXT: Next-Generation Project; MED: Medical and Well-Being Project

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